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GAS JOURNAL

LIGHT ✦ HEAT ✦ POWER ✦ BYE-PRODUCTS

[Founded in 1849 as the "Journal of Gas Lighting."]

VOL. CXLVII. No. 2934.] LONDON, AUGUST 5, 1919. [71ST YEAR. PRICE 8d.

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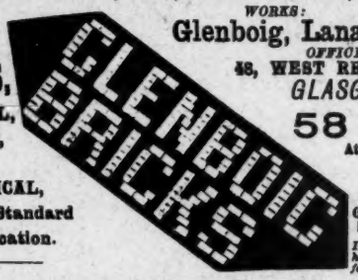

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EDITOR & PUBLISHER: WALTER KING. OFFICE: 11, BOLT COURT, FLEET ST., LONDON, E.C. 4.

VOL. CXLVII., No. 2934.] TUESDAY, AUGUST 5, 1919. [71ST YEAR.

EDITORIAL NOTES.

An Important Lead by the South Metropolitan Gas Company.

THE South Metropolitan Gas Company are taking an independent but practical lead by accepting the report of the Board of Fuel Research on the quality of gas and the heat unit basis of charge, and are preparing to make an application to Parliament in connection therewith, including a revision of the sliding-scale terms. This is a momentous proceeding, not only for the Company, but for the gas industry at large; and it may, or may not—one cannot tell—have unexpected influences just at the time when discussion is proceeding on details of the report between the National Gas Council and the Board of Fuel Research. We hope it will not have any influence other than to the good of the whole industry. The Board, we believe, fully understand that the conditions under which the South Metropolitan Company manufacture gas are peculiar to it, and have only reached the level of to-day by slow and diligent application and large expenditure, which could not be entertained by other concerns generally. Moreover, the manufacturing system of the Company, and the ideals of its administration, shut out the elasticity that it is evident from the report of the Board Sir George Beilby and his colleagues are persuaded should be incorporated in gas manufacture in order to allow gas undertakings the fullest opportunity for serving the cause of coal economy, and industry with the grades of gas that it requires.

The intelligence of the projected move by the Company is conveyed in the half-yearly report of the Directors, who, be it noted, accept the report of the Board of Fuel Research "in its entirety." So accepting it, the Directors propose, in due course, to ask the assent of the proprietors to the promotion of a Bill embodying the recommendations made, which, it is believed, will be the means of giving a new Charter to the Company. The calorific value of the gas will then become the basis of charge; and steps will be taken to utilize present-day knowledge by the adoption of a higher standard of purity and pressure. "The effect of "this cannot be other than to increase the popularity gas "already enjoys for domestic use." It is also intended (as previously intimated) to ask at the same time for a new sliding-scale applicable to the changed conditions. This is the substance of the announcement; and it shows the Directors are not desirous of waiting for any general legislation, but are willing to accept *in toto* and at once the advice and recommendations of the Board. We see no reason whatever why there should be any hesitation on the part of Parliament to accede to the Company's desires, seeing that they are prepared to take the report as it stands—inerts, pressure, sulphur compounds, and all included. The administrators of the Company know their own position; they know exactly what under their conditions they can do, and already accomplish, in relation to the 12 p.ct. of inerts; and, by the catalytic process of purification, sulphur compounds. But there is the question of economical gas production and saving upon coal; there is also the question as to whether there is any practical necessity for such close refinements as are practised by the Company. What the Company are prepared to accept may not be economically advantageous for other concerns. Therefore it is that we hope that their willingness to work to the prescriptions of the report will not be taken to signify ability on the part of other undertakings to do the same, or reasonableness in expecting them to do so. Another point is that Dr. Carpenter and his fellow-Directors are obviously satisfied that there is no insurmountable obstacle to adopting the calorific value of gas as the basis of charge, as some other gas men have done.

There will be lively interest as to the lines of the sliding-scale "applicable to the changed conditions" for which the Company will ask. Others who have been considering this matter find their inventive ingenuity sorely taxed; but from what Dr. Carpenter has said on previous occasions, there is no doubt the price of coal will be made a factor in the new sliding-scale. Perhaps new introduction will not stop there. Labour and all materials and goods have risen enormously in price; and there is no reason to anticipate any stability in these costs—at any rate, the last five years contain such lessons for the gas industry in these matters that care must be exercised in seeing that the industry is not again caught with legislation incapable of dealing with any exceptional circumstances. A paragraph in the report states that "the cost of wages is more than "double that of the corresponding half year of 1914, while "coal is two-and-a-half times dearer." And, further, the Directors speak of the gas industry, with the whole nation, being menaced by the grave situation in the British coalfield; and an expression of opinion is added that, in the adoption of those principles which govern gas supply, could be found, if applied to coal, a remedy for the grievous state of things which threatens the life of the nation. In such statements and recognition of the possibility of still unknown issues from the present grave position and likely later developments, is found additional weight for the plea for comprehensiveness and guarded flexibility in devising a new sliding-scale.

There we have what is the feature of the half-yearly report of the Directors; and it shows their confidence that the report of the Board of Fuel Research is something that will be of immense value in helping to rehabilitate the gas industry after the severe battering it has had through the subversion of pre-war economic conditions, and through statutory constitution being unequal to the strain of the wartime and new circumstances. What this means is shown by the accounts. The profit for the half year only suffices for the meagre return of 3 p.ct. allowable under the Statutory Undertakings (Temporary Increase of Charges) Act, with a balance of £6633 to be carried forward. This is an improvement, though the consumption of gas shows a reduction compared with the corresponding period of 1918. But it is gratifying to note that the sales are only 2·35 p.ct. below the corresponding pre-war period, which, there is agreement with the Directors, is not an unsatisfactory result, having regard to the fact that the Fuel and Lighting Order remains operative. The sum (after paying interest charges) available for ordinary dividend is only £112,032, which is a poor return for a total expenditure of £2,014,775, and a revenue of £2,184,484. But when it is seen that coal into store cost in the half year £1,084,429, and that wages absorbed £692,896—making together £1,777,325, or over 88 p.ct. of the total expenditure—a tale of most remarkable change is told. It is, of course, appreciated that some part of the total wages mentioned is included in the "coal into "store" item; but the calculation is sufficiently approximate to be illustrative of the point we wish to make. The quantity of coal carbonized in the half year was 584,916 tons, or 18,504 tons less than in the June half of 1918; but the cost of the lower quantity was (as already stated) £1,084,429, or £87,813 more. Fortunately, from the coal there was a somewhat better make of gas—12,134 c.ft. per ton, as compared with 11,941 c.ft. in the first half of 1918—the total production in the two periods having been respectively 7,097,928,000 and 7,206,018,000 c.ft. Last half year the

total sale was 6,722,170,000 c.ft., against 6,863,847,000 c.ft. in the corresponding period—a decrease of 141,677,000 c.ft. due to the Fuel and Lighting Order, of which decrease 126,429,000 c.ft. was in private consumption. But one has only to look at the £143,555 of rental for meters, stoves, and fittings, and see that it has increased by £22,698, to find all the confirmation required as to the vitality and stability of the business. The receipts for gas sold amounted to £1,413,116, which is greater by £248,108; but the price is 9d. more than it was in the corresponding half year—4s. 4d. against 3s. 7d.

Returning to the manufacturing expenses, it is seen that the total was £1,562,952, or £205,632 more than in the June half of 1918. Repairs and maintenance of plant is an item entailing in these days much additional outlay—the total for the half year being £312,154, or £85,624 more. Under the heading of distribution, repairs and renewals again score heavily; the total spent in this department being £280,190, or more by £120,048. A footnote shows that the total expenditure on wages was £692,896, compared with £511,169 in the corresponding half year, or £181,727 more. The total expenditure was £2,014,775, or £327,057 more. The gas receipts and the rents from meters, stoves, and fittings have been mentioned. The secondary products, it is remarked, realized £626,262, or an increase of £81,984. But seeing that coke yielded £488,010, or more by £127,164, the difference between this figure and the £81,984 increase in the total revenue for secondary products is due to the backward movement of ammonia and products, tar and products, and breeze—the first-named item alone showing a decline of £32,653. The report says: "The Company's "overseas trade is still hampered by official restrictions; "the export of valuable bye-products being held up by re-"gulations which are quite inappropriate to peace condi-"tions." Dr Carpenter will, we have no doubt, have something to say regarding this at the meeting of the proprietors to-morrow week. Deducting expenditure from revenue, there is a balance to carry to the net revenue account of only £169,708, or an increase of £25,854. In the figures we have quoted, there is every reason for seeking the aid of Parliament to place such an important public service on a basis consistent with financial health, commercial life, and the new times.

The Government and Nationalization.

The Government are apparently on the horns of a dilemma in connection with the nationalization question. They are not blameless. Rash promises or half-promises were made by them to extremist leaders of labour at a time when blood was running very hot in the labour world, and there were many swollen heads. Now the Government have on the one side a few powerful extremists—powerful because they have autocratic influence over men of less intellectual capacity than themselves, and so are in a position (they think) for holding the Government at bay—while, on the other side, there is practically the whole of the business and economic intelligence of the country resolute against nationalization. Again they are faced with the problem of "direct "action" on the part of the Triple Alliance—the Miners' Federation with its, approximately, 700,000 members, the National Union of Railwaymen with its 400,000 members, and the Transport Workers' Federation with its 300,000 members—on political questions, including this one of nationalization. And in this violence is threatened to democratic government, and to the supremacy of the Government itself. The ballot papers on the subject of "direct "action" to hold up the nation not on industrial matters, but on purely political issues, have already been distributed; and so here we are brought into immediate contact with a challenge to the nation as to whether or not there is to be supersession of the work of elected Parliament by industrial action through the tyranny of a revolutionary minority, among whom the President of the Miners' Federation (Mr. Robert Smillie) stands pre-eminent.

These are perilous times. The industrial and the commercial positions of the country are both menaced by past Government action in connection with labour, and by the use of the cards that the Government have placed in the hands of the extremist labour leaders, and which so well serve their game. But though the Government are largely to blame for the present situation, we do not believe the right action is being taken in attempting to hustle them at the moment into declaring their policy in regard to nationalization. While they have not (at the time of writing) announced their policy in this regard, their acts in connection with transport and electricity have—combined with their "promises, or half-promises" to the labour extremists—shown well-formed tendencies, from which, under pressure from men of large experience in industry and commerce, there has had to be partial retreat. But a policy has to be declared in connection with the coal mines—the issue is there a clearly defined one. And it is on this question that we suggest the Government should not be hustled. It may be freely admitted we have suffered enormously from the policy of wait-and-see; we are to-day suffering vastly from precipitate action and rash promise. But if we are not mistaken in our reading, there are signs of labour sobering down. There are influences operating against the ultraist labour leaders; and so these political strategists are anxious to press matters home promptly. The general ranks of labour will do well to refuse to be forced to give a verdict until all sides have been heard, and the *pros* and *cons* have been fairly weighed. There are leaders of the stamp and the authority in the labour world of Thomas, Stanton, Thorne, Brace, Roberts, Clynes, and others who (trade union men to the backbone) see the danger to the country of utilizing purely industrial organizations to destroy any of the power of democratic Government. Anything that is done to undermine the industrial and commercial strength of this country, they see will rebound upon the workers themselves, and upon them most fiercely. They are men who know that a nation is a conglomerate body, every constituent part of which properly placed is necessary to the other parts. Their voices are being heard cautioning as to where unconstitutional action is leading.

The warning is being heeded. The rank-and-file of the workers are beginning to appreciate that high wages and low hours of labour have their limits, that production is an essential factor to the maintenance of their position, that other countries are prepared to occupy all places of advantage created by British failure and excesses, the result of which will be that British labour will suffer with the rest, and be the first to suffer. The nascent appreciation was seen in the Yorkshire coal strike, where masses of the miners soon tired of being deprived of earning their good money over a trivial difference in the piece-time rates; it was seen in the resentment that was shown over the action of the miners, through greed or misleading, depriving of work men and women of other industries—100,000 at least had their employment stopped in a few cities and towns; and it was seen in the resolution passed, at the instance of Mr. Stanton, by the Cwmtillery miners to the effect that "all persons acting "under the red flag of revolution be immediately expelled "from representing this lodge on any Committee, on the "Miners' Federation, or on any body where the interests "of the Cwmtillery miners are at stake." The good educational work is growing. The people are beginning to see through the conspiracy of the anarchical extremists, and to realize that in their hands the rank-and-file are the tools, and it will be the tools that will suffer first and greatest. The effects of illegitimate action are at work. Though the country may suffer, and the storm may be heavy, we feel confident (from what has already been experienced) that the lessons will be permanently salutary. But given time it may not come to that. Commonsense may yet triumph over senseless and extreme measures. The more immediate trouble is that the enlightening work that is proceeding will not have been carried far enough before the ballot on "direct action" is taken, and then, if favourable, the extremists will rush matters into a contest with the country—the issue being whether Government by the democracy or by fanatical trade unionists is to dominate the nation. There is only one answer to this, and no doubt as to its permanency.

The coal mines are to be made the cockpit of nationalization. This is clear. If the necessary majority of the miners declare in favour of direct action, it will be because they know no better, and because they are at present the slaves of leaders who act without any scruple as to the ultimate result. The character of these men is brought out in true light when, after having the miners' hours shortened and their wages raised to levels never even dreamed of before the war, they say: "Give us nationalization, and "we will give you full output," which is tantamount to the threat: "If you do not give us nationalization, we shall "take care the country shall not have full output." This is the pistol of the highwayman, of the destroyer of national

interests, of the betrayer of even his own flesh and blood. These individuals will not listen to reason; they will stand out for what they have asked for. But they are helpless without the rank-and-file; and it is the rank-and-file that the Government must reach through the labour leaders who are loyal to both country and labour. Mr. Smillie himself shows signs of fear that there is likely to be a labour split. At Durham last Saturday week he said he regretted that at the moment there seemed to be a split among them, and he urged the miners to fight shoulder to shoulder for "great" principles. He discerns danger; and he has good reason. He has not shown to the nation yet, and has not convinced thinking people, that it is in the national interests that the coal mines should be nationalized. It is not a ballot of the miners, railwaymen, and transport workers alone that should be taken on the question of direct action by trade unions, but of every person throughout the country who is entitled to a vote. Mr. Smillie objects to miners acting unconstitutionally where the Miners' Federation is concerned, but is quite prepared himself to act unconstitutionally where the nation is concerned. And the nation cannot allow even Mr. Smillie to subvert legitimate government.

These considerations show the grounds for danger and hope. They indicate clearly that the extremists will stick to their claim for the nationalization of the mines. But the Government cannot afford to neglect the strength of the opposition there is in the country. Up to last week the Government had not definitely settled their course of action. Mr. Bonar Law said so, although certain newspapers had rather indicated that the Government were now leaning towards, and were hoping to find a safe refuge in, the report that was made by Sir Arthur Duckham. "The Times" Parliamentary Correspondent states definitely that Sir Arthur's scheme would be taken, but the parts considered to be unworkable would be modified. The proposals in the report would not satisfy Mr. Smillie and his like; but they would satisfy most other people. It is the most rational and constructive report of the four; it takes a middle course; and it gives the miners all their leaders require without actually nationalizing the mines. And we have yet to be brought to the belief that the miners are such sensitive men that they would be able to put forth more energy with the nation as their masters than with employers on the lines suggested by Sir Arthur. Briefly put (as will be remembered) his plan comprises the acquisition by the State of the whole of the mineral rights of Great Britain; the creation of a Ministry of Mines; the division of the country into areas; the amalgamation of the colliery interests in these areas in order to obtain a proper co-ordination of working, with the coal worked on lease by the amalgamated interests, under the control of statutory district boards to include representatives of the shareholders, the managers, and the workpeople. The scheme would give all the results for which nationalization is being demanded; and it would avoid the dangers which nationalization will bring in its train. But it is not likely to satisfy Mr. Smillie; and the Government must be prepared for all eventualities.

Ammonia Topics in the Alkali Report.

The gratitude of the gas industry must again be expressed to the Chief Inspector under the Alkali Works Regulation Act (Mr. W. S. Curphey) and to Mr. Linder and all the District Inspectors. The annual report which Mr. Curphey has just issued is a plain readable record of the work of 1918; and the large section devoted to research in which the gas industry is particularly concerned is quite in keeping with that helpful personal assistance which the managements of gas undertakings so willingly acknowledge as coming from the Chief Inspector and the members of his staff. These excellent relations have been particularly appreciated by the industry during the stressful years of war. This week we are confining our extracts from the report to the sections dealing with ammonia production, with some experiences on the direct process of sulphate of ammonia making, concentrated ammonia, and the use of nitre cake—reserving for a subsequent issue or issues, the research work into (1) the direct process of sulphate making, and (2) ammonia losses at purifier and still. A few general observations may be made to give point to the information published this week. We are pleased to see that last year, notwithstanding all drawbacks, the aggregate ammonia produced at all sources, expressed in terms of 24½ p.ct. sulphate, approximated so closely to the output in 1916, although so much below the production of 1917. Last year it was 432,551 tons, a drop of nearly 26,000 tons on 1917, when the figure was 458,617 tons; but only a falling-off of about 1000 tons compared with 1916, when the output was 433,703 tons. Gas-works were not responsible for the whole of the decline last year when compared with 1917; but they, or the conditions under which they were working, were accountable for some 15,000 tons of the backward movement. At the same time, they exceeded the make of 1916, when their total yield was 172,269 tons, which compares with 188,478 tons in 1917, and 173,541 tons in 1918. There is a notable similarity between the trend of the gas-works figures from 1918 to 1916 with those for the three years 1914 to 1912. In 1914, the make was 175,930 tons; in 1913, 182,180 tons; and in 1912, 172,094 tons.

However, as Mr. Curphey points out, there were many things that tended to cause the falling-off of production last year—the inferior quality of coal, the use of water gas, the steaming of retorts, the larger make of gas per ton of coal, and the manufacture of concentrated ammoniacal liquor, which is frequently accompanied by a high working loss of ammonia. There is one point the Chief Inspector has omitted, and that is the lower consumption of gas due to the operation of the Fuel and Lighting Order, which resulted in the carbonization of less coal, and the six weeks' drop in the demand for gas for munition purposes from the date of the armistice. Combined, the factors are sufficient to account for the recession of output; and it cannot be attributed to any general carelessness, for the gas industry is growing keener every day over the profitableness of higher efficiency. The mention of the steaming of retorts is interesting, because one of those obvious points that are sometimes overlooked is found here. Steaming increases the production of ammonia per ton of coal carbonized; but it reduces the quantity of coal it is necessary to carbonize, which with the high prices of these times means economy. Many of the gas-works that have for war purposes been making concentrated ammoniacal liquor have since reverted to sulphate production. But the reference to the ammonia losses in connection with the production of concentrated liquor, brings out an interesting point from Halifax, where Mr. W. B. M'Lusky has been making a quantity of concentrated liquor available for sale equal to 30·54 lbs. of 24½ p.ct. commercial sulphate of ammonia, which is better than the results of his former sulphate working. No doubt he possesses a very efficient plant, and gives to it good supervision. But there must be a supplement even to this to account for the excellent experience; and Mr. M'Lusky indicates what the supplement is when he mentions that he has been using a proportion of dry dusty Durham coal, and that he has been consistently spraying this. There is very good ground for believing the steam generated as a result of the spraying has had its effect upon enlarging the ammonia results.

The coke-oven production of ammonia, also expressed in terms of 24½ p.ct. sulphate, does not show any marked variation; and it is still below the gas-works aggregate yield, though the quantity of coal carbonized must have something like parity. The production last year was about 2000 tons below that for 1917, but 5000 tons above that for 1916—the actual figures for the three years being: 1918, 164,448 tons; 1917, 166,354 tons; and 1916, 159,506 tons. There is a significant comment in the report to the effect that before the war the construction of coke-ovens in this country was largely under German control, while during the war important additions to plant have been made by British effort and British material. What has been gained during the war in this direction will not be lost in future.

If the direct process of sulphate of ammonia production does not yield materially improved results, it will not be through want of suggestion and investigation of causes on the part of Mr. Curphey and his staff. There is a distinct tone of disappointment over the continued relatively low returns from the system per ton of coal carbonized. All the same, new installations have been made; but there has been discontinuance of the system at two works. On the other hand, the advice that has been given in previous reports where heed is paid to it, is having a very distinct effect in producing improvement. Information is supplied as to Professor Cobb's system of utilizing the sulphur contained in coal for fixing ammonia in gas as sulphate of ammonia without the use of sulphuric acid supplied from outside; and there is mention of the fact that a plant has now been completed for producing a ton of sulphate per day. This is

a working-scale trial; and, as soon as Prof. Cobb has reliable results from regular operation, we shall hope to have the pleasure of publishing them.

The Gas Traction Report.

The report of the Inter-Departmental Committee on Gas Traction is one of those documents which illustrate the fact that things are not always as they seem. No one before the question of gas traction came to be seriously investigated would have imagined that it offered such fertile ground for study in its main features and pendant details. On first blush, one would have thought there was practically only one real problem—that of the gas-container. But it is not so; hence the valuable report from which we elsewhere give copious extracts, but which do not nearly stretch themselves over the contents. This is not our fault; it is due to it being virgin soil, and the matter having been placed in the hands of an enthusiastic and diligent Committee, with a Secretary looking after it of such unquenchable spirit as Mr. E. S. Shrapnell-Smith. There is one important thing that should be done. It is in the national interests that home-produced motor fuel should be used to the outmost extent; and therefore the habit of employing gas for traction should be encouraged by Government departments. This encouragement is important from every economical aspect. The less we have to pay for imported fuel, and the less the cost of road traction, so much the better. Enlarged experience confirms the original statement that 250 c.ft. of ordinary gas are equal to a gallon of petrol; but, in the case of passenger traffic, there is something to be added for the time absorbed in the filling of the containers, and the loss of profit during the time. Even so, the actual running costs contained in the report proves an economy, which has a substantial effect on the balance-sheet in proportion to the extent to which gas displaces petrol. The container is still the chief problem. The old flexible ones, which were merely make-shifts, hurriedly brought into use to meet exigent circumstances, are speedily departing. They served their day and purpose. Semi-flexible ones are now being adopted. But the Committee do not hesitate to condemn where it is necessary, and recommend what they approve. This is essential to the best progress. The rigid container for compressed gas is also with us; but the Committee are looking hopefully to large developments in the use of cylinders made of carbon or certain alloy steels. The report deals with compressing plants, pressures, regulation of air supply to gas to secure complete combustion, meters, piping, joints, reducing valves, gauges, and other accessories: and it forms a complete account of the current position and knowledge concerning this important development in the use of gas.

Look into Your Rating Assessments.

It is a mystery why more gas companies do not investigate well the question of their rating, especially in these difficult times when every saving is of importance. There are, we feel confident, numberless cases where companies are paying more than they should do. The matter is brought to notice by the success which the Torquay Gas Company have scored as the result of an objection to their assessment. The rating was fixed in 1913 for gas-works, mains, &c., at £3990; and, acting under the advice of Mr. Arthur Valon, M.Inst.C.E., the Company have induced the Assessment Committee to reduce this to £2450. This will mean a saving of something like £600 a year to the Company, which is a sum that cannot be a matter of unconcern in these times. The Assessment Committee's advisers were Messrs. Body & Son, of Plymouth. The success in this case may form a suggestion for others.

Inform the Share and Stock Holders.

The statutory rights of the gas industry have strong support in a technical and commercial superiority in the use of coal. This point should be made very clear to the share and stock holders of all gas companies at their forthcoming meetings. The Gas Light and Coke Company have circulated among their stock holders three pamphlets—one giving a report, reprinted from the "Journal," of the proceedings on the occasion of a deputation from the National Gas Council being received by the President of the Board of Trade; the second supplying extracts from the pronouncements of scientific authorities on the subject of coal conservation and the fuel of the future; and the third reproducing portions of an address by Major Phillip Dawson and of speeches on the position of the electricity supply of the country. It is right that those who have invested money in the gas industry should have the facts contained in these pamphlets put before them, as together they form a solid piece of evidence as to the soundness of the foundation of the industry, and the hollowness of the claims of the electricity supply industry that it has superior virtues in respect of heating, that it contributes to the conservation of coal, and that therefore it should receive preferential consideration from Parliament. These claims have (and so has much else) been completely exploded; and it is only the duty of the gas industry to give the information the widest possible circulation, and assistance in this can be accorded by those holding capital in gas undertakings. The gas industry has to fight against forces that are strong, not on account of superior merit, but because they have succeeded in capturing Government assistance on a purely one-sided case. If the Government did the right thing in the interests of the country, they would now drop at once their electricity lans, and start *de novo* to consider the whole case of coal use and conservation, and co-ordinate not alone the generation of electricity, but the industrial uses to which the fuel resources of the country are put. The gas industry has no desire to do anything to stay the progress of electricity; but it has interests to serve, and these are not confined to itself, but are of national importance. Perhaps it will save inquiry if we say here that similar pamphlets to those distributed by the Gas Light and Coke Company can be secured from the British Commercial Gas Association.

Gas-Fires, Health, and National Economy.

A hygienist of the first water is Dr. C. W. Saleeby, F.R.S.E He likes the pellucid air of Washington and New York, where the burning of soft coal is forbidden; but he is back in the long-detested dirt of London. To his year-long appeals as a hygienist, he finds national economy supplies overwhelmingly cogent arguments against the crude combustion of coal, which should be regarded as a raw material, and not as a fuel. Last Wednesday an article from his pen appeared in the "Daily Telegraph," in which he developed a case against the continued use as a fuel of such valuable raw material. Towards the end of the article, the remedy for the evils arising from coal combustion is reached. The obvious course is that which, on principle, Dr. Saleeby has been following for many years past—never to buy or consume an ounce of coal but to burn gas (the convenient fuel which coal yields) instead. "Any amount of nonsense," he says, "has been talked about gas; and, as we are now bound by imperious necessity to practise sense in this matter, we may as well learn to talk sense too. If the whole of the worst alleged in the interests of health against gas-fires were true, as it is not, the indictment would be trivial as compared with that which I have indicated against coal smoke pollution of our air and skin and clothes and food and lungs. Of course, a gas-fire needs arrangements for the removal of the products of combustion. What fire does not? There is no more difficulty about making such arrangements in the one case than in the other. Will not all the friends of cleanliness and beauty, who hate the tree trunks blackened even as far as our superb Kew Gardens, join with all the friends of hygiene and hasten the reform, which is also an immense and urgently imperative piece of national economy?"

New Low-Temperature Claimants.

There are more of them. The old are still with us; and there are one or two that it has been arranged to prove on a large scale. There are other propositions that are to receive trial in this country; and there is a little scramble as to which shall be first. As will be seen on another page, the Summers low-temperature system is coming over from America for trial here. It is one that incorporates continuous operation; and it gives that compression to the plastic coal which is necessary if a good coke is to be made, and if the range of coal that can be used with low temperatures is not to be limited. Tozer and Marshall long since recognized the need for this in their retort; and this largely accounts for its design [see "Journal," March 4, p. 453]. From information supplied by Lieut.-Col. Clarke, it appears that Dr. Harold G. Colman has been retained for investigating the work-

ing of the Summers system; and a plant is going up in this country to ascertain how it will work with English coal. Lieut.-Col. Clarke seems to be confident of success, though his words indicate that there are difficulties still to be overcome. "I am convinced," he remarks, "that the difficulties of the process will be overcome, and that both technically and commercially a solution of the problem has been arrived at." Of course, we do not know all that Lieut.-Col. Clarke does about the system; but we should prefer to wait until the difficulties have been overcome, and tests made with English coal, before asserting that the solution has been found. Then another aspirant for favour is the Freeman multiple retort, upon which Dr. R. Lessing has reported. The outburst of low-temperature energy was expected with the signing of peace. There is no harm in this; it is all to the good, providing only proved facts are announced, and the public do not burn their fingers again, as they did over Coalite.

Tar Distillation in Gas-Works.

That this should increase is only in the natural order of things. Mr. W. S. Curphey, the Chief Inspector under the Alkali Works Regulation Act, states, in his report for 1918, that the installation of tar-dehydrating plants in gas-works continued to extend, while plants for the full distillation of tar also increased in number, and that two plants of the continuous type for the distillation to pitch were in course of erection at the end of the year. It is a continuous plant that Mr. J. P. Leather has at Burnley; and from it he is obtaining very profitable results, which throw into the shade what he was able to bring to account for tar when dealing with the tar distillers. The results of the working of the plant, as shown by the table in our news columns to-day, bear witness to this. The net balance on the working, after charging for the gas consumed, was £5756 11s. 3d.; and this is equal to £2 1s. 6d. per ton on the 2711 tons of tar produced during the year.

The Yorkshire Coal Stoppage.

The mischievous stoppage of the coal mines in Yorkshire continued last week; and this productive coalfield, on which so large a part of industry depends, yielded nothing towards the pressing requirements of the country. So there were more factories closed-down, more coal stocks exhausted, and more people who have nothing to do with the trouble were unwillingly thrown out of employment. The difference between the Yorkshire District Union and the Government was comparatively small; but for the latter to have given way would have brought demands for equality from all over the coalfields, and precipitated the country in another crisis. The formula accepted by the Miners' Federation for increasing the piece rates in consideration of the reduction of working hours was explained last week; but the Yorkshire District are not content to abide by the agreement made by the Federation. So they insist on preferential terms and the applying generally of the maximum advance of 14·2 p.ct. According to the Government, the result of putting the seven-hour day into operation in Yorkshire is an average difference of fifty minutes; and the equivalent average advance would therefore be 11·8 p.ct.—not the 14·2 p.ct. claimed—worked out as described last week.

Coupons for Developing Gas Apparatus Sales.

We have had enough of food coupons to last a lifetime; and there is no longing for a recrudescence of this particular brand of coupon. But there are other uses for coupons of another order. The Commonwealth Edison Company of Chicago has been largely developing sales of electrical appliances by the coupon system, using the retailers of other goods as their channels of communication with the public. There is a very large section of the public who believe they are doing a good thing to get a discount, or for their expenditure something beyond what they may order—overlooking the fact that some time or other it is the consumer who has to pay. It is an old advertising trick to give away coupons with a pound of tea or other commodities—the collection of a certain number of coupons entitling their owner to some article. The Edison Company of Chicago have a scheme entered upon in collaboration with retailers, whereby the latter in their business give away coupons as a cash discount; and these coupons, having certain values attached, are eventually exchanged for electrical apparatus. All shops engaging in this scheme have an electric sign outside; so that the would-be purchaser knows before he enters a shop whether or not he or she will be the recipient of a coupon. It will be seen from a paragraph in the "Electricity Supply Memoranda" what a remarkable effect the coupon system has had in developing the sale of electrical appliances in Chicago. There may be a hint here for those who are looking for novelty in connection with the sale of gas appliances. It provides a means of helping to conceal the heavy costs of all gas and electric appliances to-day, and making the holders of the coupons believe they are doing a good piece of business. Of course, it is also the equivalent of the method of paying on the easy instalment plan. It is an idea, too, that might be incorporated with the prepayment meter system, in connection with the allowance of discounts on the heat unit basis of charging. Suitable large bottomed kettles or saucepans or incandescent mantles or burners, might be exchanged for the coupons. Although at first blush it cannot be said that we have any liking for this sort of thing in the gas business, there may be quite good arguments against the existence of prejudice; and therefore the matter may be left to readers to see whether they can discover in the idea a germ of utility worth cultivating.

PERSONAL.

The Brighouse Town Council have accepted the resignation of Mr. HAROLD DAVIES, the Manager of the gas-works, who has been appointed Engineer and Manager at Chesterfield; and tribute was paid at the meeting to the good service which Mr. Davies has given at Brighouse. Mr. J. F. Bottomley (the Chairman of the Committee) said Mr. Davies had made the local works second to none in the country for their size.

Mr. W. E. HARRIS has been appointed to the position of Engineer and Manager of the Swindon United Gas Company. Mr. Harris has been in the service of the Company for the past six years; and in December last he was put in charge *pro tem.* He previously held the positions of assistant manager and distribution superintendent. Before going to Swindon Mr. Harris was one of Mr. A. W. Summer's assistants at Grays; and he has also served at the Staines and Windsor Gas-Works. At Swindon he has charge of a works making over 250 million cubic feet per annum, and a district with nearly 13,000 consumers.

Last week we announced the appointment of Mr. DIXON, Assoc.M.Inst.C.E., as Gas Engineer at Lancaster (but, in error, gave his name as Charles, instead of George). Mr. Dixon was educated at Liverpool College, and subsequently served an apprenticeship at the Mersey Engine-Works. He completed his engineering studies at the Liverpool University—graduating "B.Eng." After serving his articles with Mr. Isaac Carr, at Widnes, he secured an appointment as general assistant on the staff there. From 1912 till his transfer to Lancaster he was chief assistant to Mr. J. H. Crowther, the Engineer and Manager of the Wallasey Corporation Gas and Water Department. Since his appointment at Wallasey, the works have been considerably enlarged—the extensions including a continuous vertical retort installation of 1½ million c.ft. per day, with all the coal and coke plant, washers, scrubbers, purifiers, &c. The whole of the horizontal retort-houses, of 2½ million c.ft. per day, have been mechanically and electrically equipped with stoking machines, coke telphers, and electric generating sets. The make of gas has increased since 1912 by 20 p.ct., to its present capacity of 731 millions.

Commercial Gas Company's Dividend.

The Directors of the Commercial Gas Company have declared a dividend on the ordinary stocks for the past half year at the statutory rates of £3 6s. 8d. p.ct. per annum on the 4 p.ct. stock, and £2 13s. 4d. p.ct. per annum on the 3½ p.ct. stock, payable on the 15th inst.

A Recent Will.—Mr. John Richard Hill, late Chairman of the York United Gaslight Company, who died on Feb. 26, aged 79, left property of the value of £111,213—the net personalty being £72,724.

Temporary Increase of Charges Act.—Applications have been received by the Ministry of Health from the Bradford Corporation and the Leeds Corporation for Orders under the Statutory Undertakings (Temporary Increase of Charges) Act.

Price of Gas in the Gas Light and Coke Company's Area.—Writing last Thursday, Mr. W. L. Galbraith, the Secretary of the Gas Light and Coke Company, said: "With regard to the reduction in the price of gas of 2d. per 1000 c.ft. to which the Press are now calling attention, it is only right to state that this was made and announced by the Gas Light and Coke Company at the end of March last. In view, however, of the recent rise of 6s. per ton in the price of coal, it will probably be necessary to raise the price of gas once more."

SOUTH METROPOLITAN GAS COMPANY.

Half-Yearly Report and Accounts.

THE following is the report of the Directors of the South Metropolitan Gas Company for the six months ended June 30, which will be presented at the half-yearly meeting on the 13th inst.

After providing for debenture interest and other charges, including the maximum dividend upon the ordinary stock authorized by the Statutory Undertakings (Temporary Increase of Charges) Act of last year—namely, 3 p.ct. per annum—there remains a balance of £6633 to be carried forward. The meagre return allowable on the money invested in ordinary stock continues to be a source of dissatisfaction alike to shareholders and employees, and cannot in the long run be in the best interests of the consumer.

The cost of wages is more than double that of the corresponding half of 1914; while coal is two and-a-half times dearer.

The consumption of gas shows a slight falling off (2·35 p.ct.) from the corresponding pre-war period—a not unsatisfactory result, having regard to the fact that the Fuel and Lighting Order remains operative. The industrial uses of gas continue to extend.

The Company's overseas trade is still hampered by official restrictions; the export of valuable bye-products being held up by regulations which are quite inappropriate to peace conditions.

At the request of the Board of Trade, the Fuel Research Board of the Department of Scientific and Industrial Research have recently conducted an investigation into the composition and quality of gas which should be supplied. Their work and conclusions have been recorded in a report recently issued by the department over the signatures of Sir George Beilby, the Hon. Sir Charles Parsons, Sir Richard Redmayne, and Sir Richard Threlfall.

Accepting this report in its entirety, the Directors propose in due course to ask the assent of proprietors to the promotion of a Bill embodying the recommendations made, which it is believed will be the means of giving a new Charter to the Company. The calorific value of the gas will become the basis of charge; and steps will be taken to utilize present-day knowledge by the adoption of a higher standard of purity and pressure. The effect of this cannot be other than to increase the popularity gas already enjoys for domestic use. It is intended to ask at the same time for a new sliding-scale applicable to the changed conditions.

As with the whole nation, the gas industry is menaced by the grave situation in the British coalfields. For the last thirty to forty years, town gas, which has proved one of the necessities of civilization, has been supplied through the medium of statutory companies financed by the thrift of all classes, with, on the whole, satisfaction to the consumer, the shareholder, and the workman. The Board are of the opinion that in the adoption of those principles which govern gas supply could be found, if applied to coal, a remedy for the grievous state of things which now threatens the life of the nation.

The Company's relations with its employees continue cordial and harmonious.

CHARLES CARPENTER, Chairman.

The Accounts.

The following are the principal portions of the accounts accompanying the report:

The first two statements relate, as usual, to the stock and loan capital. The former sets forth that the standard rate of 4 p.ct. is payable on £6,011,224 and £598,671 (Act of 1901, as amended by the Act of 1916) stock. The amount of 5 p.ct. preference stock under the 1916 Act is £250,000. The loan capital account shows that the loan capital, the rate of interest on which is 3 p.ct., amounts to £1,798,994 and £96,451 (Act of 1901, as amended by the Act of 1916). The amount, at 5 p.ct., under the Act of 1916 is £500,000. The third statement is the capital account. It stands as follows: Amount received, £6,211,816; nominal amount added by conversion (less premium), £3,043,524—total, £9,255,340. The items of expenditure are as follows:

Capital account to Dec. 31, 1918			£5,525,309 16 10
Expenditure during half year to June 30, 1919—viz.:			
New buildings and machinery	£3,500 0 0		
New and additional mains and services	1,641 0 7		
New and additional meters	1,748 14 3		
New and additional stoves	2,274 8 10		
		9,164 3 8	
Total expenditure			£5,534,474 0 6
Balance			677,342 5 9
			£6,211,816 6 3
Nominal amount added by conversion, less premium			3,043,523 13 0
Total			£9,255,340 0 0

The net revenue account shows a sum of £112,032 applicable to dividend. The balances of the reserve, renewal, and insurance funds stood as follows on June 30 last: Reserve fund, £129,891; renewal fund, £34,344; insurance fund, £87,154.

The following is the revenue account:—

REVENUE ACCOUNT—*Expenditure.*

Manufacture of gas—			
Coal into store, including £3678 5s. 10d. for London Port and tonnage dues	£1,084,429 11 7		
Purification	27,878 13 1		
Salaries of Engineer and Officers at works	32,525 15 1		
Wages (carbonizing)	105,964 4 11		
Repairs and maintenance of works and plant, less £9949 13s. 2d. received for old materials	312,154 7 7		
		£1,562,952 12 3	
Co-partnership		..	
Distribution of gas—			
Repair, maintenance, and renewal of mains and service-pipes	£79,694 6 1		
Salaries and wages of officers, including rental clerks	41,007 3 9		
Repair and renewals of meters	59,913 6 2		
Repair and renewals of stoves	54,278 0 4		
Repair and renewals of gas-fittings	45,297 14 7		
		280,190 10 11	
Public lamps, labour and materials £24,574 3s. 2d., less £18,184 9s. 8d. received for the same		£,389 13 6	
Rents, rates, and taxes—			
Rents payable	£1,779 11 0		
Rates and taxes	53,557 19 3		
		55,337 10 3	
Management—			
Directors' allowance	£2,867 0 0		
Salaries of Secretary, Accountant, and clerks	7,112 4 2		
Collectors { Ordinary	8,825 3 4		
Collectors { Slot meter	30,476 0 8		
Stationery and printing	11,655 8 1		
General charges	15,783 6 11		
Company's Auditors	112 10 0		
		76,831 13 2	
Miscellaneous—			
Law charges		87 1 6	
Parliamentary charges		39 4 9	
Bad debts		454 12 4	
Stolen from 459 slot meters broken open		237 3 7	
Superannuation, sick, and accident funds		19,373 7 3	
National Insurance Act charges		5,618 4 5	
Gas Referees and Official Auditor		348 15 2	
Leasehold renewal fund		1,000 0 0	
War Fund		5,915 1 7	
Total expenditure		£2,014,775 10 8	
Balance carried to net revenue account		169,708 10 9	
		£2,184,484 1 5	

Receipts.

Sale of gas—			
Lady Day at 4s. 4d. per 1000 c.ft.	£800,273 18 8		
Midsummer at 4s. 4d. per 1000 c.ft.	593,383 7 4		
	£1,393,657 6 0		
Public lighting	19,459 9 5		
		1,413,116 15 5	
Meters at rent	£56,795 5 1		
Stoves and fires at rent	39,621 11 1		
Gas-fittings at rent	47,138 7 11		
		143,555 4 1	
Residual products—			
Coke	£488,010 6 11		
Breeze	1,5 6 2 11		
Tar and tar products	81,208 3 10		
Ammonia and products	55,497 17 4		
		626,262 11 0	
Rents receivable		1,462 5 11	
Transfer fees		87 5 0	
Total receipts		£2,184,484 1 5	

Total amount paid in salaries for half year, £69,656 1s. 2d.
" " " wages " £692,896 17s. 5d.

The remaining statement is the balance-sheet, which gives the value of the stores in hand at the close of the half year as follows: Coal, £207,769; coke and breeze, £34,771; tar, ammonia, and products, £230,460; and sundry plant and stores, £293,874. The figures this time last year were: Coal, £114,564; coke and breeze, £73,921; tar, ammonia, and products, £176,796; and sundry plant and stores, £319 589. A sum of £61,902, co-partnership bonuses and savings, has been deposited with the Company; and the total of the superannuation and guarantee funds is £175,243.

Statement of Coal.

In Store Dec. 31, 1918.	Received During Half Year.	Carbonized During Half Year.	Used During Half Year.	In Store June 30, 1919.
Tons. 152,958	Tons. 546,469	Tons. 584,916	Tons. 2052	Tons. 112,459

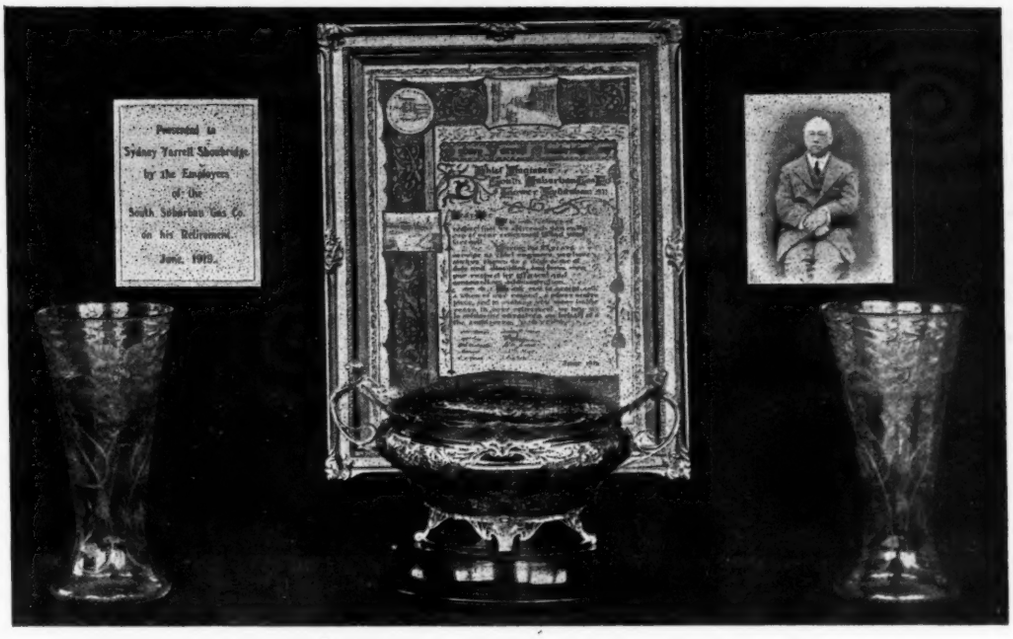
Statement of Residual Products.

Description.	In Store Dec. 31, 1918.	Made During Half Year.	Used During Half Year.	Sold During Half Year.	In Store June 30, 1919.
Coke—tons	46,886	358,856	62,614	320,173	22,955
Breeze—tons	6,932	43,147	25,468	23,687	924
Tar—gallons	507,229	5,413,954	5,391,709	3,382	526,092
Ammoniacal liquor—butts	10,870	212,455	214,694	..	8,631

Statement of Gas Made, Sold, &c.

Quantity Made.	Quantity Sold.		Total Quantity Accounted for.	Number of Public Lamps.
	Public Lights (estimated).	Private Lights (per Meter).		
Thousands. 7,097,928	Thousands. 103,739	Thousands. 6,618,431	Thousands. 6,825,178	24,835

THE PRESENTATION TO MR. S. Y. SHOUBRIDGE.



THE Bank Holiday having necessitated early going to press with this number of the "JOURNAL," we are unfortunately prevented until next week from giving an account of the presentation made last Saturday to Mr. S. Y. Shoubridge by the employees of the South Suburban Gas Company, as a mark of their esteem and goodwill, on the occasion of his retirement from the position of Chief Engineer. Meanwhile, however, readers will be interested to see the accompanying photograph of the portrait, illuminated address, and other handsome gifts, of which the presentation consisted.

ELECTRICITY SUPPLY MEMORANDA.

WRITING before the discussion by Standing Committee B of the Electricity Supply Bill clauses relating to the purchase of generating stations and transmission lines, it is quite manifest that, now the idea of District Boards has been superseded by joint representative local enterprise, the purchase proposals will have to undergo very radical modification. Else, it is abundantly clear the new electrical authorities, largely composed of those already in possession, will contemplate very little in the purchasing line. It hardly seems to have been appreciated what a big change has been made by the conversion of the District Board clause to the one as it now stands in the Bill. What before had the appearance of nationalization or semi-nationalization, has been reduced to central control and supervision by a body of Electricity Commissioners, whose legislative work will be subject to a department—the Board of Trade or the Ministry of Ways and Communications—and the department to the two Houses of Parliament. Everything now seems to have changed, and a new atmosphere has been created. Even the purchase terms do not appear to be quite the fearsome things that they were before when the plan for District Boards, over whom the present owners would have had no control, was in existence, and grew uglier the more it was examined. Then local authorities were anticipating that their generating plants and transmission lines would be taken from them at the price of the unliquidated capital which they represented, or in the case of companies at their original cost less depreciation. We believe that, in the "Memoranda," the first note, or one of the first notes, of warning as to the unfairness of the proposal was given, and point made of the fact that the money that would be received would be of less than its original value, while the plant would, on the basis of to-day's prices, have considerably appreciated in value. The Electrical Correspondent of the "Engineering Supplement of the Times" has, in the July issue, taken up the question of the purchase clauses; and he attributes them to officialdom or indifferent legislators. Their crudeness and obvious unfairness are a complete justification for the suggestion. There is no question the idea was to obtain for the Boards on the cheapest possible terms the generating plant in existence, so as to get for them a nucleus on which to build. The Electrical Correspondent is clearly disturbed over the narrow escape the electricity industry has had from an unnecessary burden of capital expended on new plant in these costly times. "In the present state of the market, there is no telling to what dangerously expensive lengths, an over-enthusiastic Board might run in its super-determination." He sees prudence in the electricity industry making the most of its existing plant until the horizon is clearer than it is to-day, and the Electricity Commissioners have had time to turn round. Under the new conditions, those who will have upon them the responsibility of developing electricity generation from existing circumstances, under the powers to be conferred, will be able to proceed more leisurely and with greater caution. It will be to their interest to do so.

The Purchase Proposals.

If we are not out in our reckoning, the Council of the Institution of Electrical Engineers have an unhappy knack of being behind the times in dealing with important matters. It does not stand alone in this respect; for another organization that we have in mind could well challenge the Council of the Electricals for supremacy in this particular. Some months ago the latter sent a report to the Government on the electricity supply scheme; but the report was the work of a Joint Committee representing large and varied electrical interests. There were many electrical engineers who considered that the position of the Institution being pre-eminent among electrical interests called for a report from it exclusively its own. It has now supplied one; but in the main too late to have any effect. The march of events is rapid; and the Institution might note that the goose step has quite gone out of fashion. The report welcomes the Electricity Commissioners so far as their institution provides for simplified procedure and control; and it is urged that the Commissioners should give whole-time service. But this matter was passed by the Standing Committee three weeks since, when it was decided that three out of the five Commissioners should reserve time and faculties wholly for their official work. The Institution Council were therefore late with their suggestion. They also urge that the present authorities should be permitted to encourage and do their utmost in the public service under the jurisdiction of the Commissioners, before that body proceeds to establish District Boards. Again the Institution Council can claim no credit for the suggestion; for the District Boards had already been abandoned, except, in the discretion of the Commissioners, for application to the areas of negligent electricity purveyors. The Council further deprecates any attempt to impose a system of rigid uniformity on the whole country, and that the Commissioners should be given latitude to facilitate schemes suitable for each district, paying attention first to the co-ordination and logical extension of existing systems. There is general opposition to the purchase terms; and it is urged that Parliament should not break faith with those who have invested their capital on the strength of the powers conferred by legislation. Naturally, those who are fathering this big scheme of electrical regeneration wanted to get plant at the lowes possible price; but this is no excuse for confiscation. One of the things that discussion has done is to explode the myth (in which

I.E.E. Behind the Times.

even many electrical men at one time believed) that the Government, having taken electricity in hand, would soon be flooding the country with cheap current. The price of money, and the cost of all structural materials, labour, fuel, and other necessaries to the running of electricity concerns have shown that the expectation was a ludicrous one, and that even the method of proceeding to work was totally opposed to realization. Many people have been duped—the Government among the rest; but few duped ones care to confess what they to-day know to be true.

The Electrical Development Association.

We are not at all sure whether, as things are shaping, the Electrical Development Association has been launched at the most suitable time, nor whether Mr. J. W. Beauchamp has taken on an easier task by transferring his services from the West Ham electricity undertaking to the Association, although the former has a deficit on revenue account for last year of £24,974, and therefore stands much in need of the most affectionate and competent direction. The Association has commenced its work. Development is necessary right away at the very start. Initial funds have been supplied by the Institution of Electrical Engineers, by the Manufacturers' Association, and by the Municipal Electrical Association; and these funds have to be applied to an attempt to develop financial support from the people who, it is expected, will benefit the most from the operations of the Association. Apparently therefore the funds are not flowing in with suitable rapidity. With heavy costs impeding their progress in all directions, with so many undertakings showing deficits, and uncertainty hemming them in, there will be a reluctance on the part of electricity administrators to add to obligations at the present time. We have not received a copy, but we understand from "Electrical Industries" that Mr. Beauchamp, in an interest-stimulating pamphlet, specifies four main functions which the Association will be able to perform, if [a little word which implies some doubt] liberal and proper financial aid is forthcoming. The "four main functions" appear to be perfectly obvious and quite harmless. The first is that the Association will provide a medium for directing attention to the development of the industry in the public service. In the second place, it will afford a means of creating interest in electrical methods, and a better appreciation of the services rendered by electrical enterprises. In the third place [honestly conducted, and we expect nothing else from Mr. Beauchamp], it will form a recognized source of information to the Press, the public, and the Government departments, on all problems relating to the use of electricity. In the fourth place, it will furnish a link between the maker and the user of electrical apparatus. Consideration of these points and their value suggests that Mr. Beauchamp must be strongly impressed with the need at the outset for propaganda work within the electricity industry itself.

General and Local Propaganda and Cost.

Our contemporary says a contrast is then drawn in the pamphlet between the "efficiency" of co-operative publicity and the wastefulness of independent local publicity. The "efficiency" of co-operative publicity in the electrical industry has yet to be proved, and so has the wastefulness of independent local publicity. Our own experience is that co-operative general publicity and independent local publicity must be regarded, if the highest efficiency and effect are to be obtained, as both indispensable. It is a mistake to suppose that the one mode of propaganda can dispense with the other; the fact being that the one is essential to, and is not complete without, the other. Perhaps the matter is being looked at from the narrow point of view of literature production for distribution; if so, an error is being made. It is pointed out, we are further told, that work which is local in character and limited in extent must be expensive in comparison with a contributory scheme where the cost of publications is reduced by quantity production—thus enabling the matter issued to be of better quality and stronger in appeal. There, again, the "quality" and the "strength of appeal" remain to be proved by the articles themselves, and not by words and promise. However, it is said that "a small increase in the amounts already spent in assisting and advising consumers would be sufficient to meet the needs of a co-operative movement." It would not, because local enterprise in business propaganda is as essential to general publicity as the latter is to the former. The work of the Electrical Development Association should be an independent charge over and beyond the cost of local endeavour. Speaking from experience, our opinion is that a too narrow outlook is being taken of what is required on the financial side of electrical development, and that the Association is making its *début* and its appeal at an awkward time.

The Coupon System of Developing Sales.

Some American methods of developing business may not take on well over here; but at the same time they may be worth consideration. We may not approve of them all—not because they are not successful in America, but because they do not accord with our notions of doing business. The idea of shopkeepers giving away, as the equivalent of a cash discount, coupons for the purchase of gas-consuming apparatus from gas undertakings does not quite fit in with our ideas as to methods of business development in an industry of the size and position of that of gas supply (where merit and knowledge circulation should alone suffice). But still, if it is good in its effects, dignity and perhaps an old-fashioned prejudice against such a system of doing things, cannot be allowed to stand in the way of its application. To this the electricity industry may give its endorsement. It has to be admitted that the figures supplied by the Edison Company of Chicago show that the coupon system has in a remarkable degree developed its sale of household electric appliances. The idea of the coupon is to give a small discount; the coupons having a cash value, but are not exchanged for cash when they accumulate, but for goods. The co-operation of retailers has, of course, to be secured. We take the following details regarding the system as applied to electrical goods from the "Electrician." The Commonwealth Edison Company entered into an agreement with the Federal Profit-Sharing Company for a supply of Federal Dividend Coupons; and these coupons were sold to retail merchants contracting for a Federal electric sign. The coupons are given by the retailers to their customers (one coupon for each 5 c.) who pay cash for goods supplied. The customers then exchange their coupons, at special shops maintained for the purpose by the electric supply company, for various pieces of electric cooking, heating, and other utility apparatus. The benefit obtained by the supply company is a resulting rise in the day load, due to the wide distribution of current-consuming devices obtained without the usual and more expensive method of personal solicitation and educational work. Consumers are by this method induced to try electric household appliances that they would otherwise not do. The following figures show the progress in sales of electrical apparatus by this method—the articles supplied being washing machines, vacuum cleaners, portable lamps, shades, coffee percolators, toasters, grills, irons, kettles, &c.: In 1915 (before using the coupon system) the total sales were £57,000; in 1916 (after coupon service was installed), £124,600; in 1917, £145,600; in 1918, £200,000; and in 1919 (estimated), £500,000. During these years contracts have been obtained for the installation of 1850 additional electric signs; and the goodwill of the Company has been greatly increased by the publicity obtained through the scheme. The figures are certainly alluring.

UTILIZATION OF LIGNITE IN AMERICA.

A recently-issued series of "Notes from the United States Bureau of Mines" contains a reference to a paper by Mr. S. M. Darling dealing with the subject of "Lignite: Its Characteristics and Utilization."

Mr. Darling points out that one-third of the known coal resources of the United States consists of lignite, which is little used because it normally contains 35 to 30 p.ct. of water as mined, but loses it by evaporation on exposure, with the result that it crumbles into fine pieces during shipment. The freight rate on the contained water is also important. As a result 2,000,000 tons of bituminous coal, hauled on the average 1000 miles, is shipped annually into territory tributary to the North Dakota lignites that could be supplied with lignite with an average haul of 400 miles—saving annually the travel for 600 miles of 50,000 coal cars and 1200 engines and train crews. The same general condition obtains in the territory tributary to the Texas lignites. Dried lignite may be used on automatic stokers, pulverized lignite may be used in that form, dried lignite briquettes may be used in hand-fired furnaces, carbonized lignite may be used in suction power-gas producers, and carbonized lignite briquettes may be used for industrial heating. Raw lignite used in bye-product gas producers yields 60,000 to 70,000 c.ft. of gas of 140 B.Th.U.; 70 to 80 lbs. of sulphate of ammonia; and some tar, of undetermined value. The experiments so far conducted open wide economic and commercial possibilities; and it is believed that the broader and more thorough investigation made possible by the recent appropriation of $100,000 for investigation by the Bureau of Mines will point the way to the establishment of carbonizing and briquette plants throughout the lignite-bearing regions of the country. The present yearly production of coal amounts to 0·017 p.ct. of the known minable coal resources of the country. C. P. Steinmetz is authority for the statement that the possible hydro-electric power that could be developed if every drop of water in the whole United States could be used would not supply an equal amount of power. It is evident, therefore, that efficient utilization of lignite resources is a problem of the first magnitude.

Photographic Evidences of Meter Readings.

An article on this subject was recently published in the Electrical World (New York), from which it appears that the Detroit Edison Company are using a special camera for taking "load-test" meter readings, to establish customers' demand charges. A regular meter-reading camera was rebuilt so that now photographs are taken showing in the picture not only the meter-reading but a watch-dial with the time of reading and also the name and address of the customer. The photographic readings have shown their value in a number of instances where differences of opinion have come up with regard to the correctness of load curves. For example, in a case where a customer raised an objection to his bill on the ground that readings were not taken exactly one hour apart, the production of an actual photograph of his meter, with the time of taking shown on the same film, satisfied him as to the correctness of the load test.

ALKALI WORKS CHIEF INSPECTOR'S REPORT.

SULPHATE of ammonia and ammoniacal liquor occupy a prominent position in the fifty-fifth annual report (covering the proceedings during 1918) by the Chief Inspector under the Alkali Works Regulation Act. Mr. W. S. Curphey has again much to say on the subject of the "direct" process of sulphate making in gas-works; and there is also as an appendix to the report (which was issued last week), a lengthy memorandum on the analysis of ammoniacal liquor. As has been the case in recent years, the reports from the several districts, prepared by the District Inspectors, have been omitted.

THE "DIRECT" PROCESS OF SULPHATE MAKING.

Readers of the "JOURNAL" will be aware, from what has been published on previous occasions, that the working of plant for the manufacture of sulphate of ammonia by the "direct" process has been the subject of special study and research during the past four years. Typical plants have been kept under continual observation, with a view to ascertaining the causes of the periods of disorganization which characterized the process at its inception. Mr. Curphey remarks that the conclusions arrived at from a study of the data furnished by this research have enabled various suggestions to be made for a more scientific control of purifier working by regulation of temperature, ammonia content of crude gas, and humidity of oxide, and for reduction of working losses by better circulation of acid liquor in the "bubbler," and more careful attention to the working of the virgin liquor still. A series of experiments on the working of a purifier set on the "backward rotation" system was recorded in the 1917 report; but at that time the valve-fittings did not permit of working on strictly orthodox lines. During the past year, however, the requisite alterations to the plant were effected, and a complete system of control was established which has furnished data of exceptional interest, as affording evidence of the advantage of instituting a complete system of scientific control of purifier working where the magnitude of operations enables the management to supplement the collection of data by laboratory analysis. At three of the works, the function performed by the "neutralizing box" has been effected in a simpler manner, and at less cost, by the introduction of a "neutralizing pipe" in the "bubbler." This pipe enables vapours from the ammonia still to be delivered direct to a point just above the bottom of the "bubbler," which in this respect performs the function of a saturator. Very favourable reports have been received respecting the efficiency of the device. Occasion will be taken to notice fully this section of the report.

REGISTERED WORKS.

Turning to the statistical portions of the report, it is seen that the number of registered works in England, Ireland, and Wales was 1414, in 64 of which operations were carried on which brought them within the definition of "alkali works." Compared with the preceding year, there was a decrease of one in the number registered as alkali works, and an increase of one in the number otherwise registered. There were also 166 works in Scotland registered under the Act. This made a total of 1580 for the United Kingdom, or two less than in 1917. The number of separate processes of manufacture under inspection last year was 2352, which was an increase of 26 on the preceding year. Among the principal increases were works dealing with residual products from the carbonization of coal. There was a decrease of two in the number of sulphate and muriate of ammonia works, and an increase of fifteen in the number of tar works. The number of visits to works last year was 3336; and of tests made, 3023. No proceedings were instituted in connection with the emission of noxious gases or vapours, though several complaints were received. But in three works registrable processes were found in operation in unregistered works.

SULPHATE AND MURIATE OF AMMONIA AND GAS LIQUOR WORKS.

In these groups, there was an increase of one in the total of 743 registered works. There were 632 sulphate of ammonia and 111 gas liquor works, compared with 634 sulphate of ammonia and 108 gas liquor works in 1917. Towards the end of the year there was a reversion to the manufacture of sulphate of ammonia in several works where plant for the production of concentrated ammoniacal liquor had been erected for munition purposes. As is well known, owing to the diminished supplies of available male labour, women were employed to a considerable extent in many gas-works; and the report remarks that the operation of the sulphate of ammonia plant is one of the numerous directions in which women efficiently carried out the necessary duties.

The section of the report dealing with sulphate of ammonia and ammoniacal liquor is a substantial one, and is reproduced on p. 288.

TAR-WORKS.

The number of registered tar-works was 375, which was an increase of fifteen over 1917. The erection of tar dehydrating plants in gas-works continued to extend; while plants for the full distillation of tar also increased in number. In two works plant of the continuous type for distillation to pitch were in course of erection at the end of the year. A complaint was received of alleged damage to fruit trees, due to emanations from a tar-works; but on further inquiry it was admitted that the injury was the effect of a blight.

Tar and Pitch in the United Kingdom

Tar distilled in—	
Gas and coke-oven works	1,510,065 tons.
Other works	131,325 ,,
Pitch produced in—	
Gas and coke-oven works	720,527 ,,
Other works	71,237 ,,

REPORT FOR SCOTLAND.

It is stated in the report presented to the Secretary of State for Scotland that the number of works registered was 166, which was a decrease of two as compared with 1917. Of the 321 processes carried on, 13 were gas liquor, 109 sulphate and muriate of ammonia, and 50 tar. The number of sulphate and muriate of ammonia and gas liquor works increased by two; the new comers being registered as gas liquor works. The requirements of concentrated liquor for munition purposes led to activity in the gas liquor works for the greater portion of the year; but with the cessation of active military operations, these requirements fell off; and towards the end of the year there was in many such works a return to the manufacture of sulphate of ammonia.

Ammonia Products, Tar Distilled, and Pitch Produced.

		1918. Tons.	1917. Tons.
Ammonia products (expressed as sulphate)—			
Gas-works	21,771		
Iron-works	11,861		
Shale-works	58,311		
Bone, producer-gas, coke, and carbonizing works	18,579		
		110,522	118,427
*Tar distilled—			
Gas and coke-oven works	142,222		
Other works	120,549		
		262,771	262,158
Pitch produced—			
Gas and coke-oven works	67,110		
Other works	66,790		
		133,900	137,012

* NOTE.—The figures for 1918 are calculated on the basis that 195 gallons of tar = 1 ton; but in previous years the basis of 200 gallons was used. The first ratio is usual in England and Ireland; the second ratio is usual in Scotland.

Of the total quantity of ammonia products, the equivalent of 24,727 tons of sulphate were manufactured as concentrated ammoniacal liquor; the balance comprised other ammonia products (sulphate, chloride, nitrate, &c.).

NEW LOW-TEMPERATURE CLAIMANTS.

Dr. Colman's Recent Visit to America.

THE SUMMERS SYSTEM.

THERE have been several references in "The Times" lately to low-temperature carbonization, and the production of a smokeless fuel. But there is more than ordinary interest attaching to a letter that has appeared from Lieut.-Col. Herman Clarke, C.B.E., R.E., because he gives information as to the object of a recent visit that he paid in March last with Dr. Harold G. Colman to the United States. About that time Prof. Bone in his Cantor Lectures stated that he hoped to see the day when low-temperature carbonization would become not only more perfect technically, but commercially more attractive than at present. He added: "That day might arrive more quickly than some people thought." To Prof. Bone's views, Lieut.-Col. Clarke refers; and then his letter proceeds:

The problem resolves itself into creating some method whereby coal carbonized can be coked within a commercially profitable length of time, and at the same time the fuel produced be of sufficiently dense and hard a character as will stand transportation, screening, and handling.

Prior to the war, and since demobilization, I have, in connection with Dr. Harold G. Colman, D.Sc., Ph.D. (who is recognized as one of the leading technical coal-carbonizing experts of the country), gone very carefully into all the conditions surrounding the carbonizing of coal at a low temperature; and in connection with our examinations and studies we, in March of this year, went to the United States and made a thorough and careful investigation into the operations of a continuous horizontal coke-oven, which has been in successful commercial operation in America for the last five years. The basic principle of this oven is its continuous operation, brought about by the action of a reciprocating floor, which by its movement longitudinally in the oven automatically discharges the coke from one end, and draws the coal from the bunker at the other. At the same time, owing to the pressure set up within the oven itself by the action of the floor, a very heavy compression of the plastic coal takes place, with the result that the fuel produced is of a hard, dense, and uniform structure, which can be handled and transported without undue loss by disintegration. The commercial operations of the oven have clearly demonstrated that:

(1) Because, partly owing to the operation being continuous, and partly to the design of the oven and the heating arrangements adopted, a more rapid carbonization of coal is effected than is obtainable in any intermittent process, and it becomes possible to carbonize within a commercial period of time and with a moderate fuel consumption for heating.

(2) Because the pressure set up by the action of the reciprocating floor compresses the coal within the retort when plastic, so as to produce a fuel which is not only free-burning and smokeless, but sufficiently hard to meet the commercial requirements of transportation.
(3) Because, owing to the continuous character of the operations, the operating costs of labour are very much less than in any other plant of this kind.
(4) Because the carbonizing conditions brought about by the continuous working are those most favourable to a high yield of bye-products, especially for obtaining a maximum amount of light hydrocarbons from the coal, suitable for motor spirit and also for the heavy fuel oils.

The oven is patented in Great Britain by Mr. L. L. Summers (the inventor), and a plant is now being constructed for demonstration purposes in the United Kingdom. As Prof. Bone states, the carbonization of coal at low temperature is technically possible, but heretofore has been commercially unsuccessful. I am, however, convinced from my study of results and my examination of the operations of the Summers system, that the difficulties of the process will be overcome and that both technically and commercially a solution of the problem has been arrived at.

The Freeman System.

An announcement has been made in the Press that a Company is about to be formed to be called the British Coal Distillation Company, Limited, with a nominal capital of £100,000, to test, and, if found satisfactory, to purchase a patent for extracting the bye-products from coal; to establish a retort made in accordance with the above patent of 10 tons daily capacity for the purpose of testing the same, and for use permanently as a testing plant for testing the value of coal; to arrange for the manufacture of the Freeman multiple retort and the supply thereof to coal owners and others, and to grant licences for the manufacture and use of such retorts. A report on the system has been made by Dr. Lessing.

GLOVER-WEST VERTICALS AT STAFFORD.

Inauguration Ceremony.

The formal opening of the new Glover-West vertical retort installation at the Stafford Corporation Gas-Works [of which a description will be given in an early issue of the "Journal"] took place last Thursday afternoon.

The Mayor (Mr. J. Rushton) with the Mayoress (Miss Rushton), Sir Walter and Lady Essex, Alderman T. Westhead, J.P. (Chairman of the Gas and Electricity Committee), members of the Town Council and officials with their wives then repaired to the gas-works in Chell Road. Here the Mayor formally declared open the new vertical retort installation, and remarked that it was an epoch in the history of the undertaking and of the town.

Mrs. Westhead, wife of Alderman Westhead, then tipped the first wagon-load of coal on to the grid near the retort-house, using a lever decorated in tricolours for the purpose. The party then ascended by lift to the top of the retort-house where, at the invitation of Alderman Westhead, the Mayoress put the first official charge of coal into the retorts. Subsequently the party were conducted round the works by the Engineer and Manager (Mr. W. M. Valon), who explained everything of interest. The construction of the new million cubic feet gasholder, contracted for by Messrs. C. & W. Walker, Ltd., of Donnington, held the attention of the visitors for some time.

Speeches at the Tea.

The guests were afterwards entertained to tea at the invitation of Alderman and Mrs. Westhead in the Borough Hall.

The Chairman, in proposing the toast of "The Contractors" (West's Gas Improvement Company, Ltd., of Manchester), said the work had been carried out to the entire satisfaction of the Committee, who had spent something like £20,000 on improving their plant. The names of Mr. Fred. J. West (representing the Company) and Mr. H. Clegg, who had supervised the work, were coupled with the toast.

Mr. Clegg suitably responded, and stated that the contract was the first his firm had completed since the cessation of hostilities. On behalf of the Contractors, he presented the Mayoress and Mrs. Westhead with silver cake stands as mementos of the occasion.

The Chairman, responding to the toast of his health, referred to a proposal which had been before the Town Council to increase the price of gas 6d. per 1000 c.ft., and had met with some criticism. He explained that in the latter half of 1917 they had to raise the price from 2s. 10d. to 3s. per 1000 c.ft.—the average price for the year being 2s. 11d. The gas sold in that period realized, after deduction of discount, &c., 2s. 6¾d., while the actual cost of production was 2s. 5¾d. —showing only 1d. per 1000 c.ft. profit. In 1918, the price was raised to 3s. for three-quarters of the year and to 3s. 6d. for the last quarter. The gas sold realized 2s. 7d. net per 1000 c.ft., whereas the actual total expenditure amounted to 2s. 6⅜d., leaving the small margin of profit of one-third of a penny. This year the price was raised from 3s. 6d. to 4s.—an average of 3s. 9d. for the whole year. The actual net receipt was 3s. 1¾d. per 1000 c.ft., and the cost of production 3s. 1¼d. —leaving a profit of only ½d. on the year's working. He explained that the 6d. increase now recommended was due to the rise in the cost of coal and wages. The Committee would have to face a national demand which had just been received for an increase of 10s. per week per man. It was questionable therefore whether they would be able to manage with only 6d. increase, which recommendation the Council had decided to refer back to the Committee.

The proceedings concluded with the singing of the National Anthem.

GAS-WORKS POWER PLANTS.

JUDICIOUS MODERNIZATION.

By H. C. Widlake, A.M.I.E.E.,
Plymouth and Stonehouse Gaslight and Coke Company.

In January, 1915, it was the writer's privilege to lay before readers of the "Journal" a short series of articles dealing with electric power installations on gas undertakings and with general considerations touching upon their choice, installation, and application.

In view of the increasing extent to which the electric motor is being applied for a whole host of purposes within the precincts of a modern gas-works, this subject is one which is daily assuming a greater degree of importance in the eyes of those upon whom rests the responsibility of designing, installing, and running the various units of plant which are essential portions of the equipment of an up-to-date works. It is extremely gratifying to note that the steady growth of this form of power application has been very little, if at all, affected by the petty attacks and veiled sneers which have in the past been levelled at the heads of those engineers who, realizing the many conveniences and economies of the electrical system of power application, have introduced it into their works. The chief object of such attacks would seem to be to confine gas engineers to the employment of old-fashioned and inefficient methods of power production; and, needless to say, they should never be taken seriously or for a moment permitted to stand in the way of any scheme which has for its object the modernization of existing plant and the increased all-round efficiency of the working arrangements. It is a noteworthy fact, however, that such attacks have not generally speaking emanated from men of assured standing in the engineering professions who can rightly claim to have a wide grasp of the general principles of engineering science.

The question has been raised as to whether it is a wise policy for a concern in active competition with an electric supply authority to use electrical power on its works; and there are to-day gas undertakings of considerable size whose power costs are kept unduly high owing to unfortunate deference on the part of those in authority to this prejudiced and wholly illogical view. Such an attitude is in itself ludicrous; but a still more absurd phase of the matter is to be found on works which go to the expense of installing the most modern type of stoking and handling machinery and then, in fanatical adherence to such old-time prejudices, handicap their new plant from the start by the application of some other form of power for the operation of machines which were expressly designed for electrical driving, and which, in this manner, are rendered inefficient, costly to maintain, unreliable, and in some cases dangerous.

Sufficient time has elapsed since the publication of the short series of articles referred to for the writer to learn that his efforts met with a considerable degree of appreciation; and in submitting this further contribution to those interested in the subject, it is intended to particularize in certain matters that in the earlier effort were merely touched upon in a superficial manner.

Now while the question of the most suitable type of generating plant is of vital importance, and one with which in the near future the writer hopes to deal on the basis of pounds, shillings, and pence, it is nevertheless a fact that although this question is one which is often decided by the local conditions pertaining, rather than by general technical considerations, those errors which go to handicap the efficient operation of many plants are frequently more manifest at the far end of the transmission lines than within the actual precincts of the power-house in which the energy is primarily generated.

Many engineers, quite apart from those engaged in the gas industry, make a fetish of low generation costs, yet remain in happy ignorance of the fact that the saving which a judicious selection and careful management of plant has effected in the generating station is more than counterbalanced by the inefficient character of the general arrangements at the far end of the transmission lines, where the power so cheaply generated is converted into a mechanical form and applied to the driving shafts of the various machines. An inefficient lay-out at this point, or the use of unsuitable control gear, may easily damn the system before it has been given a sporting chance to prove its worth; and in this article the author will endeavour to deal with matters connected with what may be termed the objective of the system—namely, with the various machines at the motor end of the transmission lines to drive which the plant has been installed.

Injudicious Modernization.

No factor contributes more largely to the cheap generation of electrical energy than does the maintenance of a good plant load factor upon the running generating set or sets; and this condition cannot be fulfilled in cases where the load consists simply of an electrically operated stoking machine installation, with perhaps the addition of a telpher for handling coke. In such an installation the load can be very much smoothed-out, and the efficiency of the engine increased, by the use of a battery and reversible booster. But viewed from a purely commercial standpoint, this merely means that, while the fuel charges per unit generated with such an installation will be less than in the case of a dynamo running direct on such a load, the increased establishment and

maintenance charges will probably more than wipe-out any saving which may be effected in the fuel bill.

Although, irrespective of the plant load factor and fuel costs, a battery of accumulators is a valuable asset on any installation, the fact remains that the best way in which to obtain a good average plant load factor is to bring as many of the power driven units of the gas-making plant under the electric drive as is economically possible. This does not mean indiscriminate planting-down of electric motors all over the shop, regardless of the hours and intermittency of working, the character of the load, and the financial and technical value of the power motors in whose place they are installed. Such modernization can only be characterized as unwise in the extreme, and will, in all probability, not even result in the attainment of an improved plant load factor.

Where to Instal Motors.

There comes a time when this question is very much to the front in the minds of most engineers on whose works an electrically operated stoking machine installation and telpher plant has been laid down, and has paved the road to a general modernization of the existing works plant. The capacity of the generating set laid down for the operation of the above installation would at first sight seem to indicate the limits to which such modernization could be carried. But it must be remembered that most works start with one generating set; and when the question of stand-by plant comes up for consideration, as it must do, the rating of such further plant is decided in the light of the purposes to which it would seem the electric drive may be advantageously applied.

In years gone by, the cost of generating the comparatively small amount of power necessary for the operation of gas-making plant has not received very much attention at the hands of gas engineers—due, perhaps, to the plentiful supply of fuel for steam-raising purposes which is to be found on most gas undertakings. And while, in the past, slackness in this respect was not productive of any serious effect on the cost of the works' finished product, the extent to which power-driven appliances are now being used brings this question very much to the front, and has rendered it essential that the whole matter should be tackled and all possible sources of waste eliminated. The subject of steam fuel charges, particularly on large works, has of late years assumed serious proportions; and engineers are realizing the fact that a ton of fuel released from the boiler plant is a ton of fuel for disposal on the district at a good price. With the high prices at present prevailing, coke and breeze can be no longer considered drugs in the market—thanks largely to the activities of the British Commercial Gas Association and to the enterprise of the London Coke Committee; and no engineer can afford to neglect the possibility of increasing his coke sales by reducing the amount of coke which is being burnt under his works boilers.

Old Steam-Engines.

The plentiful supply of fuel which is naturally always available for steam-raising purposes on gas-works, coupled with the fact that a supply of steam is essential for the operation of bye-product plants, water-gas plants, and in the retort-house, will in all likelihood account for the large number of simple non-condensing steam-engines which are to be found doing work which could be as efficiently, and usually much more cheaply, performed by a gas-engine.

Steam "Eaters."

The engine usually installed for the operation of elevators, conveyors, washers, pumps, &c., on most gas undertakings is generally of the single cylinder non-condensing type. But apart from the fact that such machines are reliable, there is no real argument to justify their continued employment on a works of any size. In the first place, the general design of these engines is such as to ensure them the reputation of being woefully extravagant, even under the best conditions (which usually do not pertain on the average gas undertaking). As illustrating the wasteful propensities of these steam "eaters," it may be mentioned that many years ago Sir Frederick Bramwell carried out a census concerning a number of steam power plants in the neighbourhood of Birmingham; and as a result of his investigations he estimated the average amount of fuel consumed per indicated horse-power-hour was no less than 18 lbs.

The writer has no data concerning the general condition of the engines dealt with in this census; but even assuming so high an average efficiency (having regard to the variety of plants dealt with and the date) as 75 p.ct., the consumption per brake-horse-power-hour would be in the neighbourhood of 24 lbs. Such factors as cold feed-water, dirty boilers, leaky valves and joints, and poor stoking, no doubt had a great bearing upon the result mentioned. But assuming an average evaporation of 5 lbs. of water per pound of fuel fired, the average consumption of these engines would be in the neighbourhood of 120 lbs. of steam per brake-horse-power-hour; and, extraordinary though these figures may seem, there is little doubt that at the time they were substantially correct and fairly representative of the conditions under which thousands of engines were working all over the country.

Even to-day there are hundreds of engines similar to those which contributed to this old census still running, and yet fallen into such a state of disrepair as to be quite capable of consuming anything from 100 to 120 lbs. of steam for every single brake-horse-power-hour developed. It is by no means an easy matter to form an accurate estimate of the actual steam consumption of engines of this type. Even if the engine is properly braked, indicated, and then tuned-up to what may be deemed a satisfactory consumption (having regard to the type of engine), it will still be very wasteful compared with a modern type of power generator, such as either a gas-engine or an electric motor.

The losses inseparable from the running of steam-engines do not stop at the engine itself—a fruitful source of lost power existing in the long runs of steam-mains (often unlagged) through which the engine derives its steam supply; and it must be remembered that losses due to condensation, radiation, and leakage are always taking place so long as the main is under pressure, and are not proportional to the hours of working of the engine. Then, again, the degree of maintenance attention usually given to engines of this type is very little, and often consists in an attitude of complete lethargy so long as the machine goes round, coupled with a feverish activity and a "lash-up" job when it eventually gives out. It is by no means unusual to find engines of this class let down into such a state of disrepair that the steam still passes through from the steam-main to the exhaust even when the engine is standing still.

An obvious remedy against loss due to the bad state of the engine, and also to condensation and radiation in the steam-main, is the provision of good branch valves at the boiler end of the pipe line, and to keep these valves shut during those hours when the engine is standing idle. There is, however, a grave risk incurred in using such isolating valves controlling long lengths of steam-main, due to the body of water which will have collected in the pipe during the idle period. It is far better to face such losses until a new order of things can be brought about, rather than run the risk of one of those accidents which can be so easily caused by the handling of steam-mains by comparatively inexperienced men, as under certain conditions it will be inconvenient for a single boilerman to attend to the charging of the long lengths of main which are to be found on most works using steam power from a central battery of boilers.

Modernization.

In considering the advisability of carrying out alterations which involve the scrapping of an existing power motor in favour of an electric motor, the following points should be considered:

(*a*) The rate at which electrical energy can be generated, and the age and general condition of the power motor which it is proposed to relegate to the scrap heap.
(*b*) Whether, taking everything into consideration, the installation of an electric motor in any particular place will contribute to a financial or technical improvement over existing conditions.
(*c*) Whether the contemplated change-over will result in any advantage which cannot be expressed in terms of pounds, shillings, and pence.

Let us now in the first place take (*a*) with a view to ascertaining the basis upon which this class of plant modernization depends for its success.

Under this heading (excluding turbine sets as being outside the power station requirements of the average gas undertaking), we find we have to deal with four general types of power producing machines—namely:

Engines used for the purpose of electrical dynamo driving in the works power station.	(1) Modern vertical high-speed steam-engines. (2) Modern horizontal or vertical gas-engines.
Existing engines used on the works for the operation of the various units of works plant—such as elevators, conveyors, &c., &c.	(1) Simple non-condensing steam engines. (2) Old pattern gas-engines.

The success or otherwise of a turnover to electrical operation will depend upon the amount of fuel (solid or gaseous, according to the type of plant installed) which either of the four types of power-producing engines under review will absorb in order to deliver 1 B.H.P. hour at the shaft of the unit of works plant to be driven. Before going any further, it becomes necessary for us to fix a rating for the sets in the works generating station; and it will be assumed, in the case under review, that this power plant will consist of one or more sets of 100 B.H.P. capacity, and that the loading is such as to enable these sets to run on an average plant load factor of 70 p.ct. This rating gives sets each capable of a continuous output (at full load) of about 300 amperes at 220 volts (the usual pressure on such installations), which should be quite large enough for the power requirements of an average-sized undertaking.

(*To be continued.*)

A Paint for Rusty Pipes.—Mr. T. J. Tonkin, of the Frankfort (Ky.) Natural Gas Company, submits a paint formula to prevent further corrosion and to give a smooth, everlasting coating to rusty pipes or tanks, as a "Wrinkle" for the Natural Gas Association of America. Take a gallon of coal tar, a quart of kerosene oil, a pint of Portland cement; mix and heat until it comes to a thorough boil; and apply to the surface to be painted while still warm. If thoroughly mixed and heated, this paint will last indefinitely above or below ground.

SULPHATE OF AMMONIA AND GAS LIQUOR WORKS.

A Section of the Alkali Works Chief Inspector's Report.

As mentioned in the summary of Mr. W. S. Curphey's annual report under the Alkali Works Regulation Act [which appears on p. 285], mention is made of a section dealing with sulphate and muriate of ammonia and gas liquor works. This "Journal" readers will be interested to read in full; and it is accordingly reproduced.

Through the courtesy of manufacturers, I am again able to present figures showing the quantity of ammonia products manufactured in the United Kingdom as a bye-product in the various industries named in the following statement:

Amount of Ammonia Products Manufactured in the United Kingdom (expressed in Terms of Sulphate, 24½ p.ct. NH_3)—Tons.

From Liquor Produced in	1918.	1917.	1916.
Gas-works	173,541	188,478	172,269
Iron-works	12,717	13,621	15,154
Shale-works	58,311	60,560	57,988
Coke-oven works	164,448	166,354	159,506
Producer-gas and carbonizing works (bone and coal)	23,534	29,604	28,786
Total	432,551	458,617	433,703

Note.—Of the above total quantity of ammonia products, the equivalent of 121,681 tons was manufactured as concentrated ammoniacal liquor; the balance of 310,870 tons consisted of other ammonia products (sulphate, chloride, nitrate, &c.).

The production and the character of ammonia products continued to be influenced by war conditions. The total quantity produced was less than in 1917 by the equivalent of 26,066 tons of sulphate of ammonia. Thus, the first and the last years of the war were both associated with a reduction in recovery of ammonia products, although in 1914 the reduction was only 6206 tons. The shringage in 1918 was large when the expanding character of ammonia recovery for many years past is considered. Many influences tended towards a reduced production. Among those affecting gas-works may be mentioned the inferior quality of coal used in many works, the use of water gas, the large production of gas per ton of coal carbonized, the use of steam in vertical retorts, the production of concentrated ammoniacal liquor accompanied too frequently by a high working loss of ammonia, and a reduction in the quantity of gas consumed.

It may be well to point out, as a similar passage in last year's report was not fully apprehended by everyone, that a large production of gas per ton of coal carbonized and the use of steam in vertical retorts may lead to an increased recovery of ammonia per ton of coal; but, if the weight of coal used per volume of gas distributed is more than correspondingly less, an increased recovery per ton of coal is associated, on a similar gas consumption, with a decrease in the actual quantity recovered.

There was, further, a reduction in the ammonia products recovered in shale-works and in producer-gas and carbonizing works, as well as a moderate reduction in iron-works.

Coke-Oven Statistics.

From a recent report on mines and quarries for the year 1918, the following statistics have been extracted:

There were 16,540 coke-ovens in use, comprising:

7013 of the beehive type.
2217 of the Otto-Hilgenstock design.
1750 of the Simon-Carvès design.
1415 of the Coppée design.
1361 of the Koppers design.
1357 of the Semet-Solvay design.
1427 unnamed.

It is noteworthy that all these designs of named origin are of foreign creation, as also are some at all events of the residue of 1427 not specially particularized. The number of ovens of the beehive type is still large; but in some cases local conditions—such, for instance, as the total quantity of local coal—may not justify the expenditure necessary for the erection of the more elaborate recovery plants. Prior to the war, the erection of recovery coke-oven plants seemed to have got under foreign (largely German) control. During the war important additions have been made to works of this class by British effort and British material; so that the future erection of such plants need not return under the former control.

The sulphuretted hydrogen evolved in course of dealing with the crude ammoniacal liquor was disposed of satisfactorily by the methods previously in use. The oxide of iron purifier came into more extensive use. In one works, a Claus sulphur recovery plant, and in another works, a combustion with subsequent neutralization plant, were discarded and replaced by oxide purifiers of the heap type. In one works the general condition of the plant was allowed to deteriorate; but new condensers were being erected and other needful improvements were being effected at the end of the year.

Gassing Fatalities.

A fatal case of gassing occurred in a gas-liquor works. Owing to omission to follow the proper procedure when taking steps to remove a blockage in the exit pipe from the decomposer in a plant for producing concentrated ammoniacal liquor in a coke-oven works, the attendant was overcome by the waste gases, which escaped in his vicinity instead of being directed into the channel provided for them.

A second fatality occurred in a sulphate of ammonia works from the action of the noxious gases evolved from gas liquor. A young woman who was operating the sulphate of ammonia plant had apparently removed a plug from a vent hole in the pipe leading from the ammonia still to the saturator and then left the plant for a short time. On her return, it is probable that she endeavoured to replace the plug but was fatally affected by the discharge through the vent hole, which would consist mainly of steam, ammonia, carbonic acid, and sulphuretted hydrogen, with possibly also some hydrocyanic acid. Death was stated to be due to carbonic acid poisoning; but other constituents of the discharge would also act prejudicially. A fatality arising in this way is most uncommon, and was not to be anticipated. Means have now been provided to prevent, by special ventilation, a recurrence of so regrettable an experience.

Direct Recovery Process.

New installations of the direct process in gas-works were put into operation; but in two gas-works the process was discontinued as unsatisfactory, and replaced by plant of the ordinary distillation type. In other gas-works the recovery of ammonia by the direct process was disappointingly low. It is only by careful attention to working conditions at the "bubbler," the ammonia-still, and the gas-purifiers, that the best results can be obtained. At those works where this process has been specially studied, further improvement in production was effected. In another works the yield of sulphate of ammonia per ton of coal carbonized was raised from 13 to 17 lbs. through the influence of these reports.

Sulphate Manufacture without any Consumption of Sulphuric Acid.

Mr. Littlefield forwards the following remarks *re* a process for the manufacture of sulphate of ammonia without the consumption of sulphuric acid, which has for some time past been under trial in one district:

> Prof. Cobb's process aims at utilizing the sulphur contained in coal for fixing ammonia in gas as ammonium sulphate without the use of sulphuric acid supplied from outside. For this purpose the gas is passed through a centrifugal washer and there treated with a solution of zinc sulphate. Zinc sulphide is precipitated, and ammonium sulphate is formed in solution. On filtration, the ammonium sulphate is recovered by evaporation. The precipitated zinc sulphide is roasted, and the roaster gases with excess of air are blown through water which contains in suspension zinc oxide from a previous roasting. Zinc sulphate is thus regenerated and the cycle completed. Tarry matter does not interfere, because it is destroyed in the roaster. The process has been proved successful on the laboratory and small works scale. The erection of a plant to make a ton of ammonium sulphate per day has been delayed by war conditions, but is now completed; and the process is undergoing trial on the full works scale indicated.

Concentrated Ammoniacal Liquor.

There were widely varying experiences in the manufacture of concentrated ammoniacal liquor as regards the working loss of ammonia. In some works this amounted to a serious figure; in others, it was no greater than had been found to arise in the ordinary process of manufacturing sulphate of ammonia as previously carried on in the same works. As an example of one of the latter, I insert extracts from a letter I received in December last from Mr. W. B. M'Lusky, of Halifax:

> You will be pleased to know that the quantity of concentrated ammonia liquor recovered and available for sale during the eight months ending Nov. 30, 1918, was equal to 30·54 lbs. of 24½ p.ct. commercial sulphate of ammonia per ton of coal carbonized, as compared with an average of 25·31 lbs. for the previous ten years on sulphate of ammonia manufacture, and 24·78 lbs. for the year 1917-18 on concentrated liquor production.
>
> The increase for the past eight months has been obtained despite the admixture of 31·9 p.ct. of Durham coal.
>
> Owing to the irregularity in the size of coal received, the thickness of the charge of coal laid on the floor of the inclined retorts varies considerably. The percentage of ash in the various grades of coal also varies to a large extent; and the quality of the coal is variable, containing at times as much as 4 cwt. of foreign matter per ton. Therefore, our results vary considerably from week to week; and it has been difficult to fix the cause of the improvement in ammonia returns.
>
> Durham coal is very dry; and we have used the water spray consistently. We attribute the improved returns to this damping of coal and coal dust, which has the effect of rolling the powder into moist nodules. The charge of coal in the retort is therefore more open, the interstices larger, and the steam generated not only keeps the charge more or less in a state of movement, but the puffing of the steam from the interstices as the carbonizing of the coal proceeds tends to form a protective envelope between the hot walls of the retort and the gas.

Steaming and Increased Ammonia Recovery.

The use of steam in coal carbonizing has, of course, long been

recognized as a means for increasing the proportion of ammonia recovered; and this is one more instance of advantage so gained. But the high yield of an equivalent of 30·54 lbs. per ton of coal could only have been reached with an efficient plant for producing concentrated liquor; while the increase of the 1918 figures over those for the previous year point to increased efficiency from accumulated experience.

The loss of ammonia during handling and storing of ordinary liquor referred to in the 1915 report is naturally of much greater importance in the case of concentrated liquor.

Dr. Fryer, in his report on another district, refers to the successful utilization of nitre-cake for the manufacture of sulphate of ammonia in the following terms:

> It has been found easy of application to the present sulphate of ammonia plant. A suitable lead-lined box, provided with grid and lead steam coils, is the only extra plant required. A nitre-cake solution with an approximate content of 6 p.ct. of sulphuric acid is made by dissolving nitre-cake in water. The solution is fed to the saturator along with the acid in certain fixed proportions. The ammonia and steam passing forward from the stills in the case of ordinary sulphate of ammonia plants, or the ammonia with the coke-oven gas in the direct and semi-direct plants, enters the saturator; absorption of ammonia takes place; and the specific gravity begins to increase. After a time, deposition of sodium sulphate containing some of the corresponding ammonium salt takes place. At this stage of the operation, an excess of back-pressure gradually begins to be thrown by the liquor in the saturator; and this is the signal for the ejection of some of the saturator liquor into the mother-liquor well. Following the latter operation, the supply of acid and nitre-cake solution to the saturator is resumed till the normal level of the bath has been restored. Meanwhile, the solution discharged to the mother-liquor well is cooling; and on reaching 46° C. practically the whole of the sodium sulphate will crystallize-out. The specifically lighter mother liquor containing ammonium bisulphate and lesser quantities of sodium bisulphate, is again injected to the saturator, and so a definite cycle of operations is established. The management of the Llwynypia Bye-Products Works of the Glamorganshire Coal Company have adopted this method of manufacture for over a year, and are well satisfied with the results obtained.

STEAMING IN VERTICALS.

Excellent Results at Dundee.

In view of the special interest now being taken in the successful steaming of vertical retorts, and the greatly improved results obtainable by this method of working, particulars of returns from the installation of Woodall-Duckham retorts in operation at the Dundee Corporation Gas-Works, under the direction of the Engineer and Manager (Mr. Alex. Yuill), will be regarded as of importance. They point to the likelihood of even better results being secured when the new installation of the same type of retorts now being erected at the works is in operation.

Mr. Yuill's figures are as follows:

Average make per ton (with steaming)		22,000 c.ft.
Coal used		Fife nuts of fair quality.
Superheated steam		550° to 700° Fahr.
Steam pressure at nozzles		35 to 40 lbs.
Gas produced		480 B.Th.U.
Crude gas content	CO_2	4 p.ct.
,, ,, ,,	O_2	2 ,,
,, ,, ,,	CO	22 ,,
Throughput per retort, per twenty-four hours		3·5 tons.

The bottom heats on retorts are good in all cases. The charges are well burnt-off, and the coke good. The coke in the producers is all screened. The coal used is easy working, and travels freely into and through the retorts. The retorts are worked off at an even gauge at the retort tops. Regular and strict attention is given to see that a constant pressure of superheated steam is maintained to the retorts at all times.

A SPRAY METHOD OF CLOSING CRACKS IN RETORT-SETTINGS, COKE-OVENS, OR FURNACES.

A method specially devised for solidly filling cracks between the fireclay jamb and adjacent silica blocks that form the end and side of the first flue in coke-ovens, but is apparently equally applicable to cracks in any pattern of retort-setting or furnace, is described by Mr. R. L. Fletcher in the "Gas Record" (New York). The difference of expansion between the two materials under heat renders the opening of joints a common occurrence; and the evil effects of air or furnace gases being drawn in under exhaust, or the escape of gases when the oven is under pressure, are well known.

Hand trowel patching touches the exterior, and is hurriedly executed on account of the exposure to heat. An application of a mixture of fireclay, silica cement, and a little salt, in solution, by means of a hand pump, hose, and squirting rod, is an improvement. Or special brands of fire cements may be used. The writer has directed attention to the possibility of blowing the mixture into the crack in such manner as to completely fill it; and to this end he experimented with a paint-spraying machine. However finely screened, the sprayer was quickly clogged; and it was necessary to substitute a special design, in which all parts could be easily opened or removed for cleaning. At first, the whole set was mounted on a portable truck—including an electric compressor, for which power could be obtained by connection with the pusher rail overhead; but later the compressor was replaced by compressed air lines direct from the power house.

After trying a number of home-made and purchased mixtures, a fluid cement known as "Hytempite" proved the most suitable. Diluted with one-fourth of warm water, it formed a solution that would freely pass the spray, but at the same time possessed sufficient consistency to fill and remain in the crack, with such evenness that little if any hand finishing was required. It was screened through a one-sixteenth screen. A small amount of air mixed with the spray was found to be an advantage; and with about 50 lbs. pressure, the crack was blown clean after the preliminary removal of the coarser material by means of a steel tool. No special experience was necessary; so that any workman could apply the process.

The October Conference of the B.C.G.A.

Owing to insuperable difficulties in regard to accommodation, the British Commercial Gas Association find it impossible to hold their annual conference in Birmingham this year. The Central Hall, Westminster, has now been secured for the conference, which, it has been arranged, will be held in London on the dates already announced—namely, Oct. 28 and 29.

Dempster "Elland" Intermittent Verticals at Singapore.

The report on the operations of the Singapore Gas-Works for the year 1918, which is signed by Mr. J. P. Hallaway (the Gas Engineer), states that three out of the four beds of Dempster "Elland" intermittent vertical retorts have been in use during the twelve months. Arrangements were made to reset the retorts; but owing to war conditions there has been considerable difficulty in obtaining the necessary materials. In order to prolong the life of the settings, several beds of horizontal retorts were brought into use, thus reducing the output of gas required from the vertical retorts. Materials are now being shipped; and it is expected that these three settings will be reset during 1919. Bed No. 3 was put out of action in November, after being in use 1574 days. Owing to shortage of tonnage from Australia, it was necessary to use slightly more than half Japanese coal. This latter coal, though in most cases producing a good make of fair quality gas, is very inferior to Australian coal for coke production; and from some coal used the coke was quite unsaleable. There has been a considerable increase in the cost; the average price of coal used being £4 18s. 6d. per ton, against £3 2s. 9d. for 1917. The pre-war cost of the best gas coal was about £1 4s. 6d. per ton. There has been a considerable increase in revenue under the head of coke, although the amount sold per ton of coal used is somewhat less, due to the inferior quality of the Japanese coal, and the fact that extra horizontal plant had to be worked on account of the non-arrival of fire-clay materials. This testimony to five years' satisactory working of the "Elland" verticals is gratifying.

Light Oil Recovery Stills and Tar Dehydration.

Describing in a paper presented at the annual convention of the Iowa District Gas Association some methods adopted at the Des Moines Gas-Works, Mr. H. C. Adams points out that the various types of stills erected for the recovery of light oils during the war can continue to be profitably utilized in part as dehydrators for crude water-gas tar. At the Des Moines works, prior to April, 1917, a continuous open-type tar-still was in operation, run in connection with a 20,000 gallon tank. This quantity of tar was circulated until it contained 2 p.ct. or less of water. All vapours, both of water and light oils, distilling off up to the temperature necessary for the removal of the water from the tar, were carried off to the air. It required from ½ lb. upwards of coal per gallon of crude tar for refining. In the month referred to, an 8000 gallon tank containing steam-coils was started at work as a tar-still; the water and light oils being driven off in the form of vapour through a worm condenser to a separator from which the light oils were run to a toluol recovery plant for fractionation. The resulting refined tar as a rule would be free from any trace of water. The amount of coal necessary to refine a gallon of tar in a closed still is less than in an open still. As there is now practically no market for the light oil recovered, this oil is returned to the tar before it is shipped. The tar drawn from the separators flows to a tar well, from which it is pumped to the tank of the relief holder, where it has a chance to settle. The lifts, however, churn the tar to some extent; and when necessary the crude tar is pumped to the tank of an unused storage holder, where it has a chance of further settling. If, on the other hand, the quality of the tar warrants it, it is pumped directly from the relief holder to the still. For contract making, tar should contain not more than 2 p.ct. of water. The specific gravity should range between 1·02 and 1·10. The tar sold should be corrected to 60° Fahr., to provide for quantities of hot tar run directly from the still to the tank-car.

NOTES ON BENZOL RECOVERY.

By M. Ch. Berthelot.

[A Paper presented to the Société Technique du Gaz en France, Metz Congress, July, 1919.]

This paper has reached us in the form of an abstract, which has been the subject of further abridgment in the following translation, owing to the necessity of omitting portions in which the author's text appears not to have been rendered with sufficient clearness by the abstractor.

M. Berthelot took the occasion to repudiate the view that the requirements of the dye industry in France depended on the development of benzol recovery, and stated that 5000 tons of benzene, 3500 tons of naphthalene, and 1000 tons of anthracene sufficed for the needs of French dye makers. The chief outlet of benzol would be as fuel for internal combustion motors; this use calling for nearly 66 million gallons. Benzol could likewise be employed as liquid fuel, and M. Berthelot appealed to gas makers to extend the use of benzol by reducing its price.

As the greater part of the volatile matter in coal distilled at temperatures below 500° C., and as, on the other hand, the processes concerned in the formation of benzol began at temperatures above 500° C., it was essential to know not the temperature of the mass of coal, but of the atmosphere in the retort. It would often be of advantage to raise the temperature of the space not occupied by the coal, but traversed by the gases in their passage to the hydraulic main.

Dealing stage by stage with the production of benzol, reference was made to alternative methods of washing gas—viz., atomized liquid in empty chambers, in chambers fitted with grids or charged with coke or quartz, with "Standard" washers, or with those of the perforated plate type, such as the Mallet. The efficiency of the grid chambers was approximately the same as those consisting of perforated plates—viz., 85 p.ct. Loss of pressure varied from 4 to 6 in. of water with the chambers and mechanical washers, and was as much as 12 to 16 in. with plant in which the gas passed through perforated plates.

A point to be emphasized was that, with every care given to the quality and quantity of the washing oil and to its temperature at the washer, no recovery plant reduced the benzol content of the gas below 220 grains per 100 c.ft., equivalent to a loss of at least 23,000 grains of benzol per ton of coal carbonized. A greater degree of cooling of the gas appeared incapable, according to M. Berthelot, of avoiding these losses. In respect of the oil used for washing, he stated that the heavy oils used in the United States, distilled between 250° and 350° C., had a density of 0·88, and remained fluid at 4° C. In Europe the oil was of density 1·04, and on distillation gave a fraction of 1 p.ct. up to 200° C., 40 p.ct. up to 240° C., and 95 p.ct. up to 300° C. About 8 gallons of oil were used per 1000 c.ft. of gas.

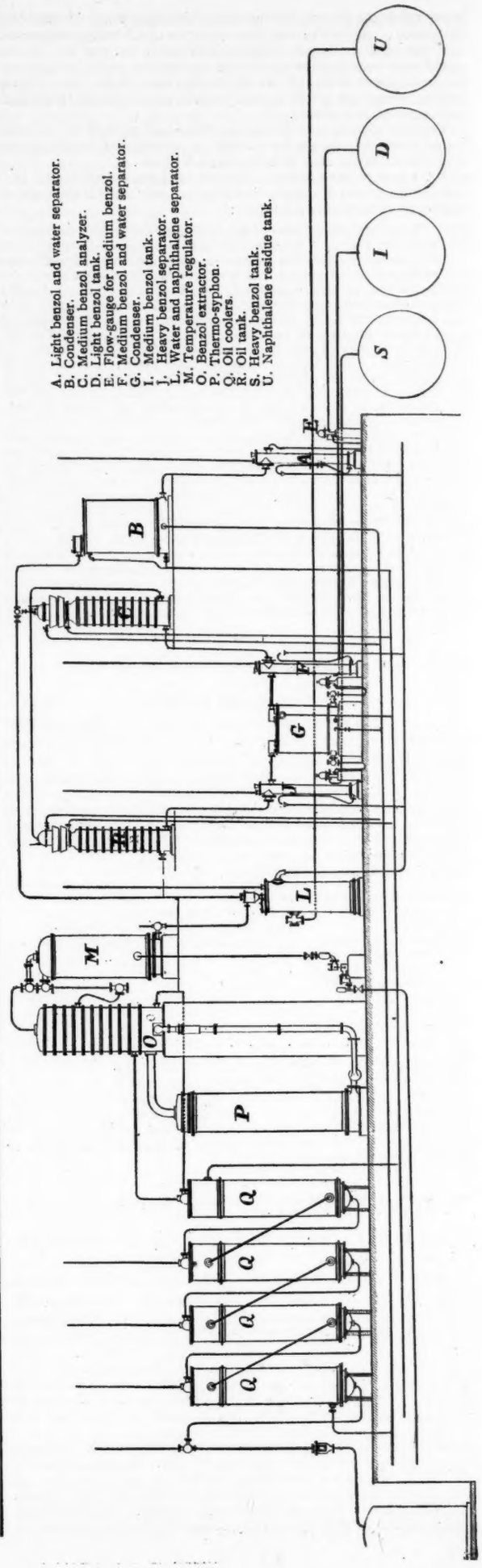
In consequence of 25 p.ct. of heavy oil passing over with light oil through the injection of steam, there was a steam consumption of 14 to 20 kilos. per kilo. of commercial product. It was necessary to obtain a crude benzol of better quality, and for this purpose advantage might be taken of the state of vapour in which the benzol existed in order to produce a species of grading. In the Mallet plant laid down at Lens in 1905, at Auby in 1907, and at Sluiskill in 1913, three grades of benzol (light, medium, and heavy) were obtained, of boiling points respectively 75°, 95°, and 120° C. In these installations crude benzol of a sufficient degree of purity could be given chemical washing without previous rectification, and the steam consumption was lower—viz., 12 kilos. per kilo. of commercial product. The crude benzol yielded 80 p.ct. of commercial benzol.

Referring presumably to the Mallet installation, M. Berthelot spoke in favour of collecting crude benzol obtained on the one hand without injection of live steam, and on the other with injection; the latter likewise being collected in two portions as required. The abstract of his paper contains the following figures relating to the quantity of steam necessary for the production of one kilo. of crude benzol.

Crude benzol produced per hour	168 kilos.
Oil debenzolized per hour	12,090 ,,
Steam consumption direct (injection in the oil)	433 ,,
Steam consumption indirect (surface heating)	1,274 ,,
Steam consumption, total	1,707 ,,
Direct heating, 25·3 p.ct.	
Indirect heating, 74·7 p.ct.	
Steam consumption per kilo of crude benzol.	10·1 ,,
Steam consumption per cb.m. (about 220 gallons) of benzolized oil treated	142·3 ,,
Steam condensed in heat exchanger	327 ,,
Ratio of direct steam condensed in heat exchanger	75·51 p.ct.

The economy effected in the Mallet plant by the heat exchanger s stated to be 13·6 p.ct. A greater economy could be obtained by employing two heat exchangers, using the heat from the debenzolized oils and from the benzol vapours. The author stated that on these lines the indirect steam consumption had been reduced in the United States from 1274 to 200 kilos., yielding 1 kilo. of crude benzol for 3·7 kilos. of steam, equivalent to 57 kilos. per cb.m. of debenzolized oil.

The plant consists essentially of a rectifying still, comprising two steam coils, one for surface heating and the other for the injection of live steam towards the end of the operation, in order to



lower the boiling point of the heavy hydrocarbons. There is a condenser of the perforated plate type, a water-tube dephlegmator and collecting tanks. Although continuous distillation secures economy in steam, plant of the intermittent type has the advantage of correct action of the dephlegmator, namely that of producing a grading of the vapour, which in turn yields to an analyzing chamber vapours which are purer than those disengaged from the boiling liquid in the still. The dephlegmator is not an analyzer, and it would be absurd to take the graded products from the dephlegmator into the still. They should be delivered at mid-height into the analyzer. The dephlegmator is an expensive item, since the latent heat of the benzol condensed in the apparatus is absorbed as pure loss by the water employed for its condensation. The author expressed the view that improvements might be made in this direction, and in dispensing with perforated plate washers which gave rise to mechanical trouble, and were ineffective in the absence of the dephlegmator. He viewed with favour rectifying plant which utilized the mechanical work done by the vapours in their displacement within a lengthy enclosure, and included devices for the removal of liquid suspended particles. It was essential that the first rectification should be as perfect as possible. As regards the chemical washing, loss of the decanted tars required to be guarded against, as they contained commazone or indene. In the second rectification the results quoted as obtained in the United States were: Pure benzene 85·3 p.ct., intermediate products 3·4 p.ct., pure toluene 9·8 p.ct., residues, 1·3 p.ct.—loss 0·2 p.ct. M. Berthelot thought that little could be said for distillation under reduced pressure, since pure products were obtained only with injection of live steam into the still, and in conjunction with a powerful dephlegmator.

In the discussion which followed the paper, M. Grebel referred to the Brégeat process of benzol extraction. M. Baril expressed surprise that the author should indicate a temperature of 25° C. as that of debenzolizing. M. Sainte-Claire-Deville, he said, had shown that much lower temperatures should be used, and in Germany cooling to nearly freezing point was sometimes practised. M. Mallet said that 25° C. was a maximum which could be regularly adopted, since it was often difficult to obtain cooling waters at a lower temperature. It was sufficient in all cases to adjust the feed of oil to the temperature of the gas.

Promising Uses for Gas.

Much attention is being paid in the United States to promising openings for gas, apart from the uses to which it has for so many years past been accustomed to be put. The latest issue to hand of the "American Gas Engineering Journal" contains an article by Mr. L. W. Alwyn-Schmidt in which he discusses this question, remarking that, with the world crying out for new industrial methods, the gas industry finds a field ready to accept any suggestions coming from its representatives. But whatever aid the gas engineers can give should be rendered as early as possible. Pointing to what has been done in the direction of using gas for motor vehicles, he suggests that the fact that much has been left to be desired in its employment for this purpose, proves only that it is very possible so to use it, while the future development of the invention must be left to a more intimate study than has been possible under war conditions. It is in the interest of gas consumption that these studies be continued; and the gas industry therefore should find the means to enable further experiments to be carried out. Again, very little has been done by gas engineers in developing gas firing for glass and pottery kilns. Nevertheless, there is a wide field here for the gas industry—and more especially just now, when interest in the development of new industries is very great. After drawing attention to some other uses, the writer goes on to say that in England industries have combined to create funds which were handed to universities for the purpose of starting research organizations; and it seems to him such methods should be an inspiration to the American gas industry. A fund might be collected to endow national research; and as in other countries a beginning might be made with a prize essay competition on how to improve the industrial consumption of coal gas. This might be followed by a similar contest on the question of gas appliances in industrial production; and, finally, prizes might be given to successful inventors producing gas-consuming apparatus for various industries.

Molesworth's Pocket Book.—Having been in existence for over half-a-century, and earning for itself a world-wide reputation, "Molesworth's Pocket-Book" of useful formulæ and memoranda for civil, mechanical, and electrical engineers has reached its twenty-eighth edition—a fact upon which Sir Guilford L. Molesworth, K.C.I.E., and Mr. H. Bridges Molesworth are to be heartily congratulated. With each fresh edition of the work every effort has been put forth to bring it up to date; and in the present edition many useful changes and additions have been made with this aim—though the authors admit that, owing to the abnormal times, they have met with some difficulty. It may be mentioned that the first edition of the pocket-book contained only 220 pages, whereas in the latest one there are 942 pages. Some 70 pages are occupied by the index—a good feature of a compilation of this character. There is a gas section, with an introduction in somewhat general terms. For the electrical supplement, Mr. Walter H. Molesworth is responsible. The Publishers are Messrs. E. & F. N. Spon, Ltd., of 57, Haymarket, S.W.

CORRESPONDENCE.

[*We are not responsible for opinions expressed by Correspondents.*]

Gas Managers' Salaries Question.

SIR,—From the "JOURNAL" dated July 8, I learn that a Committee has been formed for the constitution of a special association of gas officials, and that circulars have been sent out with regard to the formation, requesting support and sympathy. I have no knowledge of the movement other than that gleaned at the meeting held in connection with the Institution meeting in May; but the objects as explained by the supporters of what may be perhaps called "direct action" has my entire sympathy.

I have not been able to understand why a new organization was necessary, and why the Institution, if really unfitted by its powers and constitution to handle this matter, could not have amended them. It appears to me that the Institution could under its present constitution state officially what should be considered a minimum salary for the proper fulfilment of the duties of the several positions on different sized works; and with such an official statement a great deal would be achieved.

Much was said at the meeting before referred to as to the qualifications of gas officials; but is it reasonable to expect more than minimum qualifications when the reward offered in possibly the majority of positions is so meagre—in many cases under minimum wages? I venture to say that, whatever technical qualifications were possessed by officials, without a protective organization, miserable salaries would still be in force. With salaries offered commensurate with the responsibilities undertaken, and the professional training required either on the technical or commercial side, the recruits to the profession will automatically provide themselves with the equipment necessary for the proper fulfilment of the duties.

I hope I am mistaken; but this question does not appear to me to have been sympathetically handled by the Council of the Institution; and I will respectfully submit that the "powers and constitution" excuse should not be considered satisfactory by the members of the Institution who are interested in this question.

J. G. TOOMS.

Christiania, Norway, July 29, 1919.

Case-Hardening.

SIR,—Although the advantages offered by the gas-fired furnace for carburizing have been generally recognized in the past from such points of view as close temperature regulation, decreased attendance, greater convenience, &c., very little information has been published regarding the consumption figures for this process; and it has been a matter of great difficulty to obtain authentic information upon this point, either from makers or users of such furnaces.

We therefore think that details of actual consumption figures of one of our special "Revergen" furnaces upon this work will be of interest. The type of furnace in question is, as you are probably aware, provided with regenerators of specially efficient design, and is fired with town gas at ordinary pressure; the air being introduced to the furnace at a slight pressure of about 3 in. or 4 in. water gauge. The figures here recorded are not the result of any specially-prepared test run, but merely an odd case-hardening job undertaken to oblige some customers of ours, whose requirements were that the material was to be charged into a cold furnace, raised to 900° C., and maintained at that temperature for eight hours to give the necessary depth of case. The work consisted of automobile gear wheels, packed in six boxes, the total weight being 713 lbs.

The required temperature of 900° C. was obtained in seventy minutes from lighting up; the figures recorded being as follows:

	Per Lb. C Ft.		Total. C.Ft.
Gas to raise furnace and charge from cold to 900°	1·29	..	925
Gas to maintain 900° for 1st hour . .	0·38	..	275
" " " " 2nd " . .	0·42	..	300
" " " " 3rd " . .	0·38	..	275
" " " " 4th " . .	0·42	..	300
" " " " 5th " . .	0·49	..	350
" " " " 6th " . .	0·49	..	350
" " " " 7th " . .	0·45	..	325
" " " " 8th " . .	0·45	..	325

The overall gas consumption for this run of 9 hours 10 min. was only 4·8 c ft. per lb. of load.

From the above figures, it is, of course, possible to readily calculate the approximate quantity of gas required for any period of carburizing, and therefore for any depth of case; and we hope that the information may be of service to any of your readers who may be interested in the running costs of up-to-date regenerative gas-fired furnaces.

A. J. SMITH,
THE DAVIS FURNACE COMPANY.

Diamond Foundry, Luton, July 28, 1919.

"Heavy Gas Bill" Complaints.—There having been complaints of increased gas bills, a representative of the local "Evening News" sought an interview with an official of the Portsea Island Gas Company, who declared that the suggestion of poor quality gas was quite unjustified. Largely owing to the clamour last year for a better pressure of gas, the pressure has been considerably increased; and this would tend to increased consumption, though it would also mean that the cooking would be done much quicker. The calorific value of the gas is higher rather than lower; and various reasons were given for the heavier nature of the bills. For instance, the serious shortage of coal has led to gas being more generally used, and the increase of rations has meant more cooking. The numbers of a household are now probably greater owing to demobilization—hence more cooking. It should also be borne in mind that there was a 6d. increase in the price of gas. People are strongly advised to read their meters each week.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

Progress of Bills.

The Examiners stated that the further Standing Orders applicable to the Swinton and Mexborough Gas Board Bill had been complied with.

The announcement was made that the opposition to the Bedwellty Urban District Council Bill had been withdrawn; and the measure was committed to the Unopposed Bills Committee.

It was agreed that the Standing Orders not complied with in respect of the petition for the Ammanford Gas Bill should be dispensed with.

The Gas and Water Provisional Orders Bill was reported, with an amendment, and recommitted to a Committee of the Whole House.

The Swinton and Mexborough Gas Board Bill was read a second time, and committed. The Wath, Bolton, and Thurnscoe Gas Board and the Wath-upon-Dearne Urban District Council have petitioned against the Bill.

The Stocksbridge Gas Bill was read the third time, with the amendments, and passed.

HOUSE OF COMMONS.

Progress of Bills.

The Pembroke Gas Bill was read a second time, and committed. The Standing Orders were suspended, and the Unopposed Bills Committee were given leave to proceed with the Bill.

The Newark Gas Bill was read the third time, and passed, with an amendment.

The Ammanford Gas Bill and the Pembroke Gas Bill were reported, with amendments.

Subsidence Compensation Bill Dropped.

This Bill was referred to in the report of the National Gas Council published last week. The Council were proposing to get mains and services included. We now learn that, in view of a refusal of the Government to accept the Compensation for Subsidence Bill (to provide for the payment of compensation for damage to property as the result of subsidence due to underground mining), and to give facilities for the passing of the money resolution, Standing Committee E of the House of Commons last Wednesday unanimously agreed not to proceed with the consideration of the measure.

DOVER GAS BILL.

The Bill promoted by the Dover Gas Company was, on Thursday last, before the Unopposed Bills Committee of the House of Commons, presided over by Mr. Whitley.

Mr. E. C. Cooper (Parliamentary Agent) said the most important parts of the Bill were financial powers set out in clauses 4, 5, and 6. There was probably no gas company which had been more hardly hit during the war than the Dover Company; and it was very unfortunate for the Company that the Directors had delayed taking the advice of their Engineer to carry out certain necessary works during the war. This was due to causes beyond the control of the Board. The result was that the works were now absolutely necessary; and they would cost a great deal more than they would have done if they had been carried out when they were first recommended. For many years prior to the war the Company had paid their maximum dividend of 7½ p.ct.; but during the war this had gradually come down until last year there was a loss on the net revenue account of £183. In these circumstances, the Directors had had to consider how they were to finance the work which it was now absolutely necessary to carry out. They had come to the conclusion that they must give up any idea of issuing ordinary or preference shares, and to do it by way of debentures. Clause 4 in the Bill took power to issue £59,824 by the creation and issue of debenture stock or by borrowing on mortgage. The clause was in common form so far as this was concerned; but the amount was made up by bringing in powers which they had to borrow under a previous Act, and altering the proportion mentioned in that Act (one-quarter) to the now usual one-third. Having regard to the difficulty in placing debenture stock on terms which would be reasonable to the shareholders, powers were taken in clause 5 to borrow temporarily on the security of the borrowing powers; so that they could, as it were, live from hand to mouth until the Directors could see their way clear to make a permanent issue.

Sir E. Moon (Speaker's Counsel) asked if there was any case in which a statutory company had been allowed to borrow money on the power to issue debentures without issuing them at all.

Mr. Cooper replied that there was the Mansfield Railway Act.

Sir E. Moon asked if there was any case of a gas company having been allowed to do this.

Mr. Cooper said he could not refer to any gas precedent for the particular power in question; but the South Metropolitan Gas Company were given power in 1918 to borrow temporarily £500,000.

Sir E. Moon said that did not mean that the Company could take debentures to the bank without issuing them, and ask the bank to lend money on them. It was a common thing to do in commercial companies; but it had not been permitted in the case of statutory companies.

Mr. Cooper: Has it been refused?

Sir E. Moon: That is another matter.

Mr. Cooper said that, with all deference, he would like to discuss the point with the Committee, to ascertain whether there was any real legislative sin in being allowed to adopt this course if necessary. The Company had now to face the prospect of being compelled to bring all their coal by sea instead of by rail. Hitherto the coal had been brought partly by rail and partly by sea; but orders had now been given to discontinue any more coal being brought by rail. This involved an additional expenditure of 16s. per ton, which, with the extra 6s. per ton recently added to the price, brought the total increase from these two causes up to 22s. per ton. It was impossible at the present moment to see what the financial effect of this would be on the Company, especially having regard to the fact that they had over a long series of years uninterruptedly paid 7½ p.ct., and that now they were working at a loss. In these circumstances, the Directors did not wish to be bound to issue permanent debentures at a rate which might be very unsatisfactory in ten or fifteen years' time; and this was why he asked for power to go to the bank or borrow money in any other way the Directors thought best.

Sir E. Moon pointed out that in the next clause of the Bill powers were asked to issue redeemable debentures.

Mr. Cooper agreed, but said that the proposition he was now submitting was that redeemable debentures could not be issued for less than two or three years, whereas he wanted to be able to go to the bank and ask for a loan of (say) £20,000 for absolutely necessary works which must be constructed at this moment. The bank would ask for security; and he could offer them the power to issue debenture stock under clause 5 which the bank might accept. Where was the harm in doing this? It was saving to the consumer. If he was not allowed to do this, he would be forced to the necessity of raising the debenture capital on the best terms he could; and at the present moment these terms would be such that they would be very hard in years to come. It was impossible for the Directors to make up their minds now for what period they should issue redeemable debenture stock.

The Chairman said that, under clause 6, it would be possible to issue 5, 7, and 10 years' debentures.

Mr. Cooper agreed, but said that he did not know at what price they could be issued. The position was governed by the bank-rate. If the bank-rate varied, he could go to the bank, if he had sufficient funds, and pay off the loan until the rate came down again or until he thought the market was sufficiently favourable to issue permanent debenture stock or redeemable stock. He did not see what the harm was in being allowed to go to the bank and borrow temporarily on the security that he could offer them. The Directors were advised by their Engineer that certain works were essential to be carried out; while, on the other hand, the position was so uncertain that they were unable to make an issue of permanent debenture stock, and they certainly could not issue preference or ordinary shares. Would the Committee put a time limit on the operation of the clause?

The Chairman said he was afraid the Committee could not see their way to grant clause 5, not even with a time limit.

Mr. Cooper argued that the Committee had already allowed it in the case of the South Metropolitan Gas Company in 1918—he would not say in this precise form, but there was power to borrow temporarily. This was in addition to powers to borrow in the ordinary way which the Company were given under the same Act.

The Chairman: It is certainly not in this form.

Sir E. Moon: I told you, Mr. Cooper, that if you brought up a clause in the form of that of the South Metropolitan Company the position would be quite different.

Mr. Cooper said he had not had time to thoroughly discuss the question with his clients. The point was that the South Metropolitan Company had been given these temporary borrowing powers in addition to, and not as part of, the ordinary borrowing powers. In his case, it would be part of the ordinary borrowing powers granted under the Bill.

The Chairman: That is part of our objection to it.

Mr. Cooper suggested that a way out would be for the Committee to give him the temporary borrowing power in addition, as in the case of the South Metropolitan Company.

The Chairman: You had better let your Bill stand over. If you want to bring up the clause to which you refer (I do not recollect it at the moment), I shall have to look at it carefully.

Clause 5 was therefore deferred.

Mr. Cooper then dealt with clause 6. The effect of this was to give the Company power to redeem out of revenue a sum not exceeding £10,000 of the stock which could be borrowed under the preceding part of the clause. He would prove, through the Engineer, that this represented abnormal expenditure in consequence of the war in respect of the works which were now to be carried out, and which the Engineer had recommended ought to have been done several years ago. It represented the additional cost of carrying out the works compared with what would have been the cost when the works were first recommended. Therefore he asked permission to redeem this amount out of reveune. As to clause 9, power was taken to get away from the limit of 4 p.ct. now existing on the preference capital, and for the Directors to issue preference stock on such terms as they might determine at the time or times of the issue of such stock. The Speaker's Counsel had thought that some rate should be specified; but the objection which his clients raised to this was that, in the present position of affairs, the rate specified, in order to ensure the stock being placed, would have to be so high that it might possibly discredit the credit of the Company, and would make it difficult to issue debentures at a reasonable rate. Therefore he was asking the Committee to give the Directors a free hand as to the rate at which they should place their preference capital. There was a precedent for this in the Brentford Gas Bill this year.

Sir E. Moon said the Committee had had to deal with a number of other Bills under present circumstances; and the normal course was to put in a limit.

Mr. Cooper said he did not know that there was any other company suffering in the same way as this one. Moreover, section 11 of the Brentford Gas Act of this year gave the Directors of that Company the same power that he was now asking.

Sir E. Moon: I suppose it is redeemable preference stock?

Mr. Cooper said it was the ordinary preference stock.

Sir E. Moon: Was the Brentford Gas Bill opposed?

Mr. Cooper said it was.

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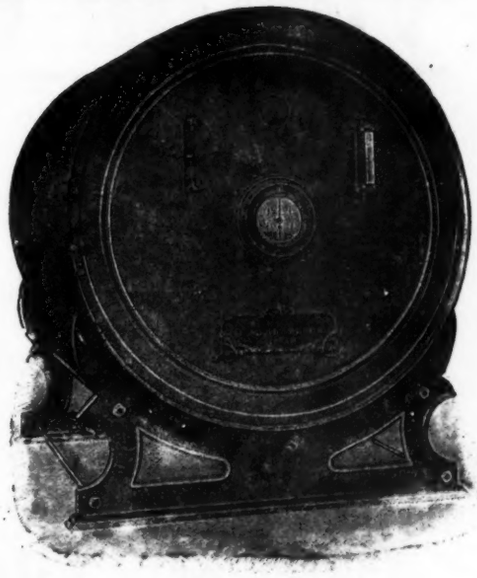

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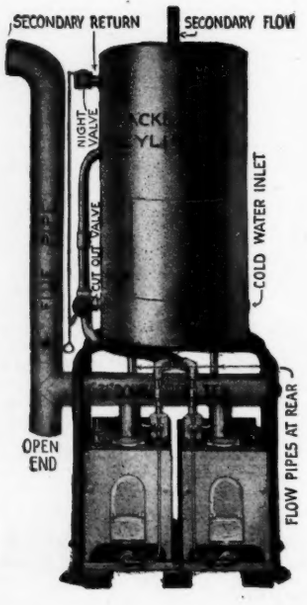

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The CHAIRMAN: What is the limit for your preference stock now?

Mr. COOPER said it was 4 p.ct.; but they had not issued any.

The CHAIRMAN asked if the issue of preference stock would require the assent of the ordinary shareholders?

Mr. COOPER said, under the clause, there was no distinct obligation on the Directors to obtain the consent of the ordinary shareholders. The position would be that the Directors would advise the ordinary shareholders of the amount of preference stock which ought to be issued, and the shareholders would be asked to give them discretion as to the price at which it should be issued. He was advised that this would be the course adopted.

Sir E. MOON asked if it would suit the purpose of the Company if they obtained power to issue redeemable preference stock at such a rate of interest as the Directors might determine?

Mr. COOPER thought he had this power now.

Sir E. MOON said it applied to both classes of stock as the Bill stood. There was nothing in the Bill confining the power to redeemable stock. Unless this clause was granted, the Company would be restricted to the limit of 4 p.ct., both as to redeemable and ordinary stock. He therefore suggested that it would suit the Company's purpose if the operation of clause 8 was restricted to preference capital issued as redeemable preference capital.

Mr. COOPER, after consultation with his clients, said they would accept the suggestion of the Speaker's Counsel, to limit the clause to redeemable preference stock.

Sir E. MOON said that what the Company obviously wanted was power to issue redeemable preference stock at any rate the Directors might determine. In addition, they would also want power to issue permanent preference stock upon which a limit should be put.

Mr. COOPER asked what rate Sir Ernest Moon would suggest.

Sir E. MOON said his own idea—he did not know how it would appeal to the Committee—was that the present rate should be raised from 4 to 6 p.ct., with the power to issue redeemable preference stock at any rate the Directors might determine.

Mr. COOPER said he had a precedent which was passed by the Unopposed Bills Committee a fortnight ago, in which 7 p.ct. was allowed for permanent preference stock.

Sir E. MOON said the difference here was that the Company was offered the right to issue redeemable preference stock without any limit.

The CHAIRMAN suggested that a clause had better be brought up later in the day. If 7 p.ct. was put in, he did not say the Committee would grant it, but they would consider it.

Evidence was then heard as to the proposal to pay off £10,000 extraordinary expenditure out of revenue.

Mr. *Whatley* (representing Mr. W. R. Herring, the Consulting Engineer to the Company) said that the actual tenders for the proposed works at the present time showed that the cost was double what it would have been had they been carried in pre-war times. The total amount was £18,000; and he estimated that the work could have been done for £8000 prior to the war.

The CHAIRMAN: And you propose to write off £10,000 out of the £18,000? You do not imagine that the value of the works will only be £8000 at the end of ten years?

Witness said that the works could have been carried out for £8000 before the war, and therefore £10,000 was a burden on the Company.

The CHAIRMAN said that in any case where the Committee had given power to write-off out of revenue in this way they had always looked at what might be expected to be the value of the expenditure ten years hence. It could not reasonably be said that more than one-third of the total expenditure could be expected to be written-off out of revenue; and the Committee could not agree to more than £6000 being written-off in this way.

The further consideration of the Bill was postponed to give the opportunity for bringing up a clause in substitution for clause 5, and also a new clause 9.

When the matter was referred to later in the day, it was decided that clause 5, giving power to borrow on the security of the mortgage issue, must come out of the Bill; it being found that the South Metropolitan clause was not adoptable, as it referred to previous Acts of the Company.

Clause 9, relating to the rate of interest on preference shares, was deferred; it being arranged that the Speaker's Counsel should draft a clause to be considered at a subsequent meeting of the Committee.

AMMANFORD GAS BILL.

The Bill promoted by the Ammanford Gas Company was before the Unopposed Bills Committee of the House of Commons on Thursday last.

Mr. BAKER (Messrs. Baker & Co., Parliamentary Agents) said the Bill proposed to acquire the undertaking of the Garnant Gas Company, and to raise further capital. The areas of the two Companies adjoined. The Companies obtained powers to supply gas in 1909, 1910, and 1911; but no supply had been given hitherto in either of the districts. Thus the undertakings were only just getting under way when the war broke out, and very considerable difficulties had in consequence been experienced. One of them was that the price of coal had been increased from 11s. to 37s. 6d. per ton. The terms of the purchase of the Garnant Company were that the shareholders of the Company were to receive £120 for every £100 held by them. At the same time, the rights under the Garnant Act which the shareholders had of receiving back-dividends were to be repealed. In the period of eight years at 8 p.ct. these dividends would have amounted to £64 in respect of every £100 of stock; but now they were merely proposing to give an additional £20 per £100 of stock. New capital was required to develop the districts, in which there were some 14,000 people at present without any supply of gas. The authorized capital of the Ammanford Gas Company was £18,000; while the authorized capital of the Garnant Company was £10,000. Having regard to the small amount in the case of the latter Company, it had been impossible for a gas-works to be erected. Only distributing mains had been laid; the gas being purchased. The maximum dividend on the original capital of the two Companies was 8 p.ct., instead of the usual 10 p.ct.; and it was proposed that the maximum dividend on the new capital should also be 8 p.ct. The local authorities did not raise any objection to the scheme—a clause having been inserted which gave the local authorities the option to purchase if they so desired. The maximum price which could be charged for gas at present was 4s. 3d. per 1000 c.ft.; but the Bill proposed an increase to 6s. This, also, was not objected to by the local authorities. At one time gas was being supplied at 3s. 6d. per 1000 c.ft.; now it was 4s. 3d. Advantage had not been taken of the Legislation which enabled an increase to be made, notwithstanding that the Company had been working at a loss. The Company, however, felt the time had come when there should be an increase in the maximum price, having regard to the increase in the cost of labour and materials. Local coal was quite unsuitable for gas making; and the Company had to go to near Cardiff—a distance of about 100 miles—for their coal.

The CHAIRMAN said the chief point in the Bill was the clause allowing £120 for every £100 of stock in the Garnant Company—a concern which had never paid a dividend.

Mr. BAKER pointed out that the Bill repealed the power to pay back-dividends.

The CHAIRMAN said it seemed a far cry to the time when the Garnant Company would have been in the position to pay back-dividends.

Mr. BAKER said he did not think so, because the Company had over 2000 consumers.

Colonel *Jones*, the Chairman of both Companies and an Alderman of the County of Carmarthen, said that about £8000 of the £10,000 authorized capital of the Garnant Company had been paid up. The two Companies were controlled practically by the same people, though there were many more shareholders in the Ammanford Company than in the Garnant Company. The reason why it was proposed to pay £120 for every £100 was that it was felt that the Garnant shareholders should have something to compensate them for the loss of the possibility of obtaining back-dividends as the Company progressed. The circumstances of the war had prevented the Company obtaining the large output it would otherwise have done. But for this, the Company would, he was convinced, have made rapid progress. Clause 13 of the Bill (providing for compensation to the Directors) had been cut out, as they had not been receiving directors' fees.

The preamble was formally proved, and the Bill was ordered to be reported for third reading.

PEMBROKE GAS BILL.

This Bill was ordered to be reported for third reading by the Unopposed Bills Committee of the House of Commons last Thursday.

Mr. SEAGER BERRY (Messrs. Sherwood & Co., Parliamentary Agents) said the Bill proposed to incorporate the present limited Company as a statutory undertaking and to acquire additional gas lands. The Company originally obtained a Provisional Order in 1871 to supply gas in the areas of the borough of Pembroke and Pembroke Dock. The present lands of the Company were full up, and new land for the purpose of new works had been acquired by agreement. The Company was a maximum price concern—5s. 6d. per 1000 c.ft.; but it was now proposed to make it a standard-price (and no sliding-scale) company—the standard price being 5s. per 1000 c.ft. It was also proposed to retain the present illuminating power test until the new works were erected, and then to substitute a calorific power test.

Sir ERNEST MOON (the Speaker's Counsel) said that Mr. Berry had called attention to the fact that no provision had been made in the Bill to limit the dividend on the preference capital; but it was now proposed to insert the figure of 7 p.ct. There was a precedent for the amount in the South Shields Gas Act of this year, when the limit was raised from 5 to 7 p.ct.

The CHAIRMAN asked if this related to short-dated stock.

Mr. BERRY said it would apply to any kind of preference stock, although, so far as the Company were advised, it would be very doubtful whether a company of this size could raise preference stock at par at 7 p.ct. to-day. The other provisions in the Bill were the usual ones applying to a statutory company.

Mr. *A. F. Phillips*, the Engineer to the Company, formally proved the preamble.

Claim Regarding Prescribed Rate of Pay.

The Portsmouth Munitions Tribunal recently sat to hear a claim by Jesse Redman against the Portsea Island Gas Light Company for £10 5s., arrears of pay alleged to be due to him. The claimant explained that he was a gas-fitter. He was discharged from the army, and was sent by the Labour Exchange to the Gas Compuny's works at Hilsea in September, 1918, and engaged as a gas-fitter. He had been employed continuously ever since, but had received only 6d. instead of 7d. per hour, the prescribed rate of pay for the district. He claimed the arrears of 1d. per hour, which amounted to £10 5s. The additions to his pay were 19s. war bonus, *plus* 12½ p.ct. of the total, which amounted to 11½d. per hour. He claimed 12½d. per hour. Mr. T. Carmichael (the Engineer of the Company) said Redman was taken on as a fitter's mate at 6d. per hour; and this was the pay he had been receiving. Redman, answering questions, said he had not been apprenticed as a fitter; but as a fitter's mate he learned the trade. Both Mr. Carmichael and Mr. C. Cassell (Chief Clerk) swore that Redman was taken on as a fitter's mate, or handy man, at 6d. per hour. A fitter's pay was 9½d. per hour, *plus* the additions; but the mate's pay varied from 5½d. to 7½d., according as the men were considered to be worth the difference in the rates. In giving the Court's decision, the Chairman said he and his Assessors were satisfied that the prescribed rate, with the war allowance and the percentage, was paid by the Company. Consequently the man's claim failed.

MISCELLANEOUS NEWS.

GAS TRACTION COMMITTEE.

Further Report and Recommendations.

There was last week issued by the Petroleum Executive a report of the Inter-Departmental Committee on the Employment of Gas as a Source of Power, especially in Motor Vehicles. The Committee were appointed at the end of 1917 to consider and report upon—

(1) The employment of gas in substitution for petrol and petroleum products as a source of power, especially in motor vehicles, and the manner in which such gas may be supplied, stored, carried, and used, with due regard to the safety of the public.

(2) The action, if any, which should be taken by His Majesty's Government to encourage and safeguard the use of gas for this purpose.

*Sir BOVERTON REDWOOD, Bart. (*Chairman*).
*Major ASTON M'NEILL COOPER-KEY, C.B.
Sir EVAN D. JONES, Bart.
Mr. H. H. LAW, C.B., M.Inst.C.E.
†Sir ARTHUR C. CHURCHMAN, Bart.
Mr. W. DOIG GIBB, M.Inst.C.E.
Dr. CHARLES C. CARPENTER, M.Inst.C.E.
*Lieut.-Col. R. K. BAGNALL-WILD, R.E. (President, Institution of Automobile Engineers).
*Mr. W. WORBY BEAUMONT, M.Inst.C.E., M.I.Mech.E.
Mr. F. W. GOODENOUGH (Chairman, Executive Committee, British Commercial Gas Association).
Mr. J. OLLIS (Chief Officer, Public Control Department, London County Council).
Alderman WILLIAM KAY, J P. (Chairman, Gas Committee, Manchester City Council).
Mr. GEORGE WILLIAM WATSON, M.I.Mech.E., M.Inst.A.E. (Engineer, Commercial Motor Users' Association).
*Mr. E. S. SHRAPNELL-SMITH (*Secretary*).

An interim report was submitted [see "JOURNAL" for April 30, 1918, pp. 191-2]; and an Expert Sub-Committee were subsequently appointed to carry out the further investigations recommended by the Committee. The following were selected to act on this Sub-Committee, along with the five members of the full Committee against whose names an asterisk appears:

Prof. C. VERNON BOYS., F.R.S..
Mr. J. G. CLARK, F.C.S.,
‡Prof. BERTRAM HOPKINSON, F.R.S.,
Mr. GEORGE J. SHAVE, M.I.Mech.E., M.Inst.A.E.,
Mr. SIDNEY STRAKER, Assoc.M.Inst.C.E., M.I.Mech.E.

At the close of their report, the Committee say: We desire, on the occasion of the signature of our report for presentation, to place on record the deep regret which we all felt when death removed our esteemed Chairman only a few days before the completion of the work to which he had devoted so much time and energy. It is a satisfaction to us to know that he had approved the final draft of the report and practically the whole of the revisions; and it may, therefore, be stated that he was in complete accord with our findings.

The first stage of the inquiry related to applications of gas traction under war conditions, and was for obvious limiting reasons necessarily confined to the supply and use of gas in flexible containers. The second stage has been completed with due regard to such altered circumstances as conduce to applications which depend for their economy and success upon the normal supply and use of (1) steel or other materials for the manufacture of cylinders to hold gas under pressure or (2) self-contained, suction-gas, producer equipment portable in type. The Committee have also taken into review new evidence in relation to extended experience with flexible and composite containers at the hands of commercial-motor users in different parts of Great Britain. They have, since their appointment, held 26 meetings (apart from Sub-Committee meetings), and have examined orally 45 witnesses. There have been 11 meetings of the Committee since the presentation of the interim report, at which meetings 23 witnesses have attended.

EFFECT OF THE COAL SHORTAGE.

The Committee say that the dangerons shortage of coal in France and Italy was necessarily reflected during the year 1918 in departmental co-ordination of authorized gas consumption throughout the United Kingdom. It may be stated, as a brief summary of the relative situation, that the coal and consequent gas shortage had at the beginning of 1918 become more acute in the United Kingdom than the petrol shortage, and that it has so continued until the present day.

Whereas gas for traction purposes was not brought within the terms of the Motor Spirit Restriction Order No. 2, Oct. 11, 1917, the Board of Trade, in consultation with the Petroleum Executive, controlled its use by the Motor Spirit (Consolidation) and Gas Restriction Order of Jan. 3, 1918. The latter Order provided that no gas was to be used for traction purposes unless a "gas permit" was obtained from the Petrol Control Department of the Board of Trade, and then only for specified purposes, with the further restriction under the Petrol Controller's ruling in the case of private cars that no petrol allowance was to be granted; but there was at that date no limitation upon the quantities of gas that might be purchased. The situation was again altered, in keeping with the increasing stringency of the coal shortage, when the Government approved the Lighting, Heating, and Power Order of March 26, 1918. Gas was rationed under its provisions for all purposes, including traction; and the Committee have ascertained that some 1800 users of gas-equipment on motor vehicles had discarded it by the middle of the summer of 1918.

The Committee were able, at the request of numerous industrial owners of goods-carrying vehicles and motor omnibuses, successfully to support claims in respect of the provision of supplies of gas for equipments or conversions that had been put in hand prior to March 25, 1918. These concessions, which affected several hundred vehicles, were made by the Petrol Controller under the authority of section 13 (Part V.) of the Order.

While in January, 1918, there were fully 5000 motor vehicles in use with gas equipment, the progressive restrictions which it became necessary for the Board of Trade to impose upon supplies had reduced this total to 3600 effective "permits" by the following January.

TECHNICAL INVESTIGATIONS.

The report details the scheme for the necessary technical investigation. Much of the work of the Expert Sub-Committee has been conducted in the laboratories and workshops of the Aeronautical Inspection Department, the Gas Light and Coke Company, and the London General Omnibus Company, Ltd.; but the Sub-Committee have additionally held eight formal meetings for the reception of progress reports and the transaction of other business of a technical nature. Certain special tests, designed to indicate the effects (if any) of varying degrees of slackness in metal straps or other fittings employed to hold in position cylinders of compressed gas, were conducted, on the request of the Committee, at the National Physical Laboratory, Teddington, by arrangement with Sir R. T. Glazebrook, F.R.S., and Dr. T. E. Stanton, F.R.S., and under their direction. Highway tests have from time to time been undertaken for the independent guidance of the Committee and to check the performances reported by witnesses—more especially in connection with portable gas-producer equipments.

The Committee proceed:

We confirm all the conclusions and recommendations of our interim report, with the single exception that, in the light of further experience, we hold it to be unnecessary to fit a non-return valve on the gas supply-pipe leading to the induction-pipe of the engine; and we now approve a specification (Appendix II.) for town-gas container fabric of cotton cambric material, to be used as an alternative to a cotton Wigan material.

We recommend that the national importance of ordinary town gas as a home-produced fuel for which an extensive distribution system already exists be generally recognized by all Departments of Government, both central and local. The encouragement of new outlets for the gaseous products of coal carbonization promises to become increasingly necessary, in order to maintain the essential balance between the different classes of products and bye-products, as and when such carbonization becomes more general. We strongly urge official recognition for the bearing of gas traction upon the whole question of liquid-fuel supplies and prices.

We recommend, in relation to our instructions to report as to the action, if any, which should be taken by His Majesty's Government to encourage and safeguard the use of gas for power and traction purposes, that all possible departmental and local-authority encouragement and provision for the extension of gas-power and gas-traction facilities be forthcoming.

We recommend that no restrictions or regulations, other than those which may be necessary to ensure compliance with the terms of our report and recommendations, be placed upon the drawing of gas for traction purposes through suitable meters at consumers' premises or private filling-stations, subject only to sufficiency of the local supplies of gas.

We are of opinion that gas traction, in its newer forms of application, merits extended adoption as a commercial alternative to electric, petrol, or steam traction—especially at the hands of owners of large numbers of motor omnibuses, goods-carrying vehicles, or tramcars.

COMPARATIVE COST OF GAS AND PETROL.

Experience with gas traction—apart from its employment for tramcar propulsion in services at Neath (South Wales), Croydon, Thornton Heath, Lytham, St. Anne's, Blackpool—dates back only to the summer of the year 1916, when the pioneers of the flexible container, Messrs. Andrew Barton and Bros., began to run a single-deck Thornycroft motor-bus between Beeston and Nottingham.

Our interim report endorsed the accuracy of the estimate that 250 c.ft. of ordinary town gas are, on the average, the equivalent of one gallon of petrol. This finding has been confirmed both with flexible and rigid containers.

We give below three representative extracts (from testimony by users) which show that satisfactory economies are realizable when ordinary town gas is substituted for petrol.

(*a*) From the evidence of Mr. W. J. Thomson, General Manager of the Scottish Motor Traction Company, Edinburgh (Feb. 13, 1919):

> Had it not been for the gas, we could not have given anything like the public service which we have been giving during the past year. Quite apart from that, however, it has paid us to use gas instead of petrol; and in support of this contention I give the following figures. We have averaged 251·4 c.ft. per gallon of petrol replaced—mostly on debenzolised Edinburgh gas. Assuming that all mileage had been done on petrol at our usual consumption of 5 miles per gallon, we should have used 237,897 gallons of petrol; and the cost of this to us for the past year was 2s. 4¼d. per gallon. This is equivalent to a total cost of £28,002 9s. 2d. Actually, our total expenditure on petrol was £10,674 13s. 10d., and the total cost of the gas used (including costs of bags, attendants' wages, &c.) was £10,843 3s. 6d.; making our total fuel bill for the year £21,517 17s. 4d—thus showing an apparent saving of £6484 11s. 10d. From this, however, must be deducted the loss of time in filling, and the loss of profit which might be made during the time for filling. The time lost in filling in our case is 40 hours per day for the whole fleet of 40 motor-buses, which is approximately £5 per day, equal to £1825 per annum. Taking the profit lost at 3d. per mile, 8 miles per hour on a total of 40 hours per day make it approximately £4 per day,

* Also member of Expert Sub-Committee.
† Sir Arthur Churchman resigned his membership of the Committee on Dec. 12, 1918, following his retirement from the Ministry of Munitions.
‡ Prof. W. E. Dalby, F.R.S., was appointed to the Expert Sub-Committee, following the death of Prof. Bertram Hopkinson on Aug. 26, 1918.

equal to £1460 per annum. These two latter items together make £3285; and taking that from the apparent saving of £6484, we still have an economy of £3199 for the year.

Even taking gas at 4s. per 1000 c.ft. (whereas my average cost over a year was 3s. 8¼d.), my year's fuel-bill for gas would come out at £11,895. If £2500 were added for gas-bags and replacements, this only comes to approximately £14,400; whereas, had I been using petrol entirely, it would have cost £28,000 in respect of my Company's 40 motor-omnibuses—a saving of nearly 50 p.c.

(*b*) From a memorandum submitted to the Committee by Mr. H. O. White, the Engineer of the Great Grimsby Street Tramways Company, Ltd., Cleethorpes (Jan. 29, 1919):

We estimate that for every 1000 miles run on gas we save £15 as compared to petrol, after meeting all charges. The number of cubic feet we have found to equal one gallon of petrol is 240. A large part of our gas supply had not been debenzolized. This figure represents a full year's working, and includes both short and long distance running.

The relative cost between gas and petrol we have found to be 8d. as against 2s. 7½d. These figures are based on the cost of gas at 2s. 8d. per 1000 c.ft., and the cost of petrol at 2s. 7½d. per gallon.

In arriving at the saving mentioned between gas and petrol, 1d. per mile (or £4 3s. 4d. per 1000 miles) is included in cost of the gas for depreciation of the container.

(*c*) From a report by Mr. G. J. Shave, M.I. Mech.E., on the experimental running of omnibuses belonging to the London General Omnibus Company, Ltd., with compressed-gas equipment, on the Cricklewood-Victoria route April 29, 1919:

The total cost of compressing 1000 c.ft. of gas to 1000 lbs. on the square inch is approximately 2s. 3d. for our present small plant (10-vehicle capacity) used intermittently. Taking gas at 4s. 4d. per 1000 c.ft., this makes a total fuel-cost of 6s. 7d. per 1000 c.ft., which, as against petrol at 2s. 4d. per gallon, shows a comparison (on our proved basis of 250 c.ft. to one gallon of petrol) of 19·75d. for gas to 28d. for petrol—a saving of 29·5 p.ct.

It will be seen that, while the cost of petrol is given at the price ruling for large contracts, that of gas is at the ordinary consumers' rate. Therefore, were the comparison made on the ordinary retail price of petrol, the ratio of percentage would be more distinct, and any reduction in the price of gas or of electric current used as a source of power for the compressor motor will show still more to the advantage of the compressed gas. Taking into account the pre-war price of gas (2s. 7d. per 1000 c.ft.), this would alone increase the economy to 48·2 p.ct.

(*d*) The Managing Director of the British Automobile Traction Company, Ltd., on the occasion of his second attendance before us after an interval of more than twelve months, reported higher consumptions in areas in the South of England at times when the gas was unavoidably of unusually poor quality. But these exceptions do not vitiate the more general experience. He also emphasized the loss of earning capacity with flexible or composite containers for public passenger services which results from their practical limitation to single-deck omnibuses.

PRICE, QUALITY, AND MEASUREMENT OF GAS: NEW CONSIDERATIONS.

Recorded figures show the charges for gas supplies during 1918 to have been lowest and highest in the undermentioned areas of supply:

		Price of Gas per 1000 C.Ft.
Galway, Ireland	Highest	7s. 0d.
Campbeltown, N.B.	Highest	6 11
Annfield Plain	Highest	6 6
Queenstown, Ireland	Highest	6 6
Berwick	Highest	6 3
Bath	Lowest	2 3
Keighley	Lowest	2 2½
Sunderland	Lowest	2 1
Coventry	Lowest	1 11
Haworth	Lowest	1 10

Our attention has been directed by several witnesses, *apropos* the above extreme divergencies in charges for gas, to the important bearing of future charges upon any extended development of traction by its propulsive agency. We desire to point out, having regard to later evidence that has been placed before us, and based upon fuller experience, that an incorrect estimate of net economies is likely to be made if a bare comparison be adopted between the respective costs for 250 c.ft. of gas and one gallon of petrol.

The evidence on behalf of the Scottish Motor Traction Company, Ltd., to which reference is made in the previous section of our report, includes details of one specific case of additional and incidental expenditure, and states the effect on net revenue of the time during which vehicles are out of running service for the purpose of re-filling flexible containers.

Another specific case of the same class was explained to us in the course of evidence on behalf of the British Automobile Traction Company, Ltd. The Managing Director of the Company pointed out that, for a particular service for which gas cost 4d., or petrol 6·25d., per omnibus-mile, the Company considered that, after providing for depreciation on the containers at the rate of 0·88d. per omnibus mile, the whole of the balance of advantage, under normal conditions of petrol supply, disappeared, owing to the loss of time in re-filling the containers. This delay, it was explained, might permit a competitor using petrol to start his omnibus a few minutes in advance of the completion of the re-filling operation, and thereby seriously to prejudice the fare-receipts on each journey of a gas-driven vehicle.

The foregoing difficulties, it must be recognized, concern the use of gas in flexible and composite containers; and they will not apply in the future in those instances in which equipment for the use of gas under compression is installed.

We are of opinion that intending users of gas traction by means of compressed gas, when seeking to make basic comparisons of fuel-cost after compression, can also reckon 250 c.ft. of free gas as the average equivalent of one gallon of petrol. While it is to be anticipated that the total cost of compressed gas will vary considerably according to quantity and working pressure required, this average volumetric relationship between the consumptions of gas and petrol for equal work on the highway will hold good.

There is an approximation to agreement among the representatives of omnibus owners that with flexible containers there must be, when using gas, and after meeting all incidental charges and allowing for lost mileage, at least £6 per vehicle per month clear saving before the relative inconveniences and disadvantages of using gas in flexible containers can be held to be compensated.

We are of opinion, having regard to the uncertainties in respect of the sufficiency of future petrol production to meet increasing and world-wide demands, that any relaxation of interest in, and much more so any abandonment of, plant and organization contributory to the preservation of a tested and home-produced alternative fuel for traction work will be contrary to the national interest. We therefore urge gas undertakings and suppliers of gas by re-sale not to dismantle or neglect any plant or other facilities in hand.

It appears to us to be reasonable to anticipate that the proved economy of gas traction under war conditions will justify the retention and extension of existing arrangements at numbers of refilling stations for the supply of gas to owners of commercial motor vehicles.

We direct attention to the fact that, should any attempt be made to establish a monopoly of motor spirit at inflated prices, users of motor omnibuses or goods-carrying commercial motors on a considerable scale—say, to an extent such as to require not less than 80,000 gallons of petrol per annum—have the alternative, where the supplies of town gas cannot be obtained at a moderate price, of recourse to gas produced at their own premises, apart from portable suction-gas producers.

We are of opinion that it will be in the interest of gas undertakings to allow as favourable a scale of discounts to consumers for traction purposes as to any other buyers of gas for power generation, provided the load is a reasonably steady one and the point of supply not at so great a distance from the gasholder as to be detrimental to ordinary consumers.

We have been able, since the presentation of our interim report a little more than fourteen months ago, to carry further our study of points affecting the general use of rotary, inferential, or other gas-measuring recorders. Two examples of these meters—one an automatic rotary and the other a hand-operated type—are illustrated and briefly described at the end of our report (figs. 1 and 2).

We strongly recommend the adoption of such new types of meters, on account of the economies in material and space which accompany

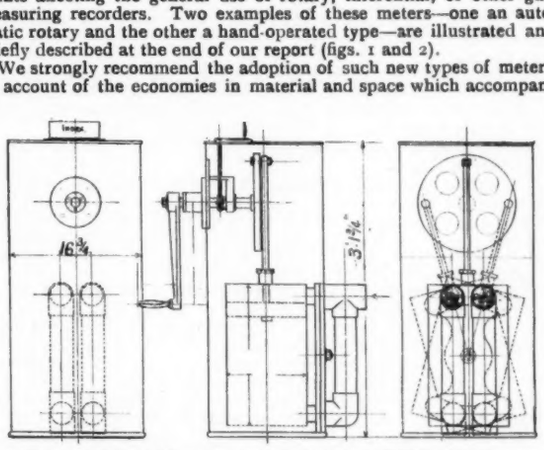

Fig. 1.—The Parkinson Hand-Operated Gas-Filling Recorder.

Each complete turn of the handle delivers 1 c.ft. of gas; a charge of 600 c.ft. can be passed in ten minutes. Officially stamped as a correct measure under the Sales of Gas Act.

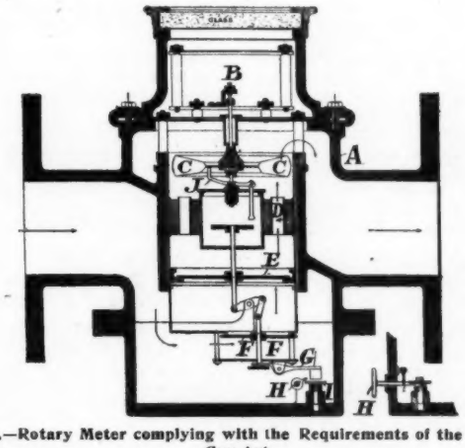

Fig. 2.—Rotary Meter complying with the Requirements of the Sales of Gas Act.

In practice, the lever H is operated from the outside, and causes the lever G, through the spring-controlled boss I, to pull down the valve F. The gas raises the disc E, and while passing through the meter by D rotates the fan C and records the volume by means of the index B. If the flow of gas falls below that at which the meter will register correctly, the disc E falls, and in so doing closes the valve F, thus preventing the passing of any more gas. A brake J prevents the fan-wheel from rotating when the valve F is closed, but allows free movement of the fan-wheel when the valve is open.

their use, subject to a certificate of accuracy (within 2·5 p.ct. *plus* or *minus* while capable of passing gas) by any meter-testing authority; that all rotary meters should be tested with a "flying" start; and that, after testing, there should be attached to each such meter a metal badge indelibly stamped to show the top and bottom limits in cubic feet per hour between which the meter is correct within that latitude —*e.g.*, "This meter has been tested and found correct between 1000 and 10,000 c.ft. per hour."

While the original cause for our interim recommendations on this subject—the acuteness of the war-period shortness of tin-plate—has to a large extent disappeared, we feel that consumers of gas whose class of use calls for the delivery of comparatively large volumes in relatively short periods of time are somewhat handicapped by the restrictions on the use of such types of gas-meters resulting from the operation of sections 12 and 13 of the Sales of Gas Act, 1859—rules to be observed in stamping and testing meters. We are of opinion that the difficulty would be overcome if power were given to the Board of Trade to approve other suitable types of gas-meters, and to prescribe rules under which they should be tested, and, if necessary, conditions under which they should be used, and that an inspector should have the same power of stamping and testing meters of a type approved by the Board of Trade as that given him under the Act of 1859.

We are of opinion, having regard to the apparent imminence of legislative sanction for a permanent measure of discretion to gas undertakings as to the calorific value of gas sold to the public, that a buyer of gas for traction purposes should be entitled, at the time of purchase, to be given any available information respecting the ruling minimum calorific value of the gas supplied and the requirements of air for its complete combustion.

After a section covering insurance experience and considerations, the report goes on to deal with composite and semi-rigid containers, the use of trailers, rigid containers, the use of cylinders for compressed gas, compressors and depôt storage, accessory parts, relative power yields, portable suction gas producers, liquefaction, absorption, adsorption, and enrichment, facilities for research work, and general investigations of the Expert Sub-Committee.

SUMMARY OF PRINCIPAL CONCLUSIONS AND RECOMMENDATIONS.

Conclusions.

1.—Gas traction is fully as safe as any other system of mechanical traction, even when exposed and unprotected flexible containers (gas-bags) are used.

2.—Gas traction in its newer forms of application merits adoption as a commercial alternative to electric, petrol, or steam traction, more especially for the propulsion of motor omnibuses and other commercial types of road motor vehicles, including tramcars.

3.—The average traction equivalent of 1 gallon of petrol is 250 c.ft. of ordinary town gas.

4.—Flexible containers (gas-bags) will be generally superseded by semi-rigid and rigid containers, wherever compression plant can be installed. But it is inexpedient, having regard to the uncertainties which surround the future of liquid-fuel supplies in relation to prospective world-wide demands, that any existing facilities for gas-traction service should be either abandoned or dismantled.

5.—In the event of an attempt to establish a monopoly of motor spirit, any consumer for traction purposes of not less than 80,000 gallons a year has the commercial alternative, where supplies of town gas cannot be obtained at a moderate price, of making his own gas.

6.—Semi-rigid containers made of rubber and canvas are unsatisfactory; but semi-rigid containers made of an inner rubber bag suitably restrained by an outer member of woven steelwire with metal end-plates, and complying with our approved specification, appear to be satisfactory for internal pressures not exceeding 45 atmospheres, although results of endurance tests in service are not yet available.

7.—The time has come to approve and encourage the use of metal cylinders, made of high carbon or certain alloy steels, to contain combustible gases at high pressures for traction purposes; and such metals can now be safely so employed for working pressures up to 2250 lbs. on the square inch.

8.—Subject to the adoption of the simple precautions specified by us, there is no risk of explosion with town gas during its compression into cylinders or its use from them.

9.—Wire-wound metal cylinders with removeable ends held in place by screwed tension-rods lose gas at the joints after the earlier stages of discharge, and are heavier for any given volume of gas than plain cylinders made of high-carbon or alloy steels.

10.—The cost of compressing town gas into cylinders, inclusive of the maintenance of compressor plant, storage cylinders and vehicle cylinders, and of interest and depreciation on the capital sums required, will vary between 1s. 8d. and 3s. per 1000 c.ft. of free gas, according to quantity required and working pressure adopted; the total cost involved being on the average equivalent to 7d. per gallon on any petrol replaced.

11.—Satisfactory pressure-reduction systems are available to effect the requisite automatic control of gas at high pressures to meet road-transport conditions for either passenger-carrying or goods-carrying vehicles.

12.—The highest mechanical and thermal efficiencies under road-transport conditions of working can be attained by average drivers when there is a non-variable air-admission area and the volume of air after initial setting is controlled solely by the travel and speed of the engine-pistons; the only hand-regulation during running being that of the gas admission (not air and gas).

13.—The relative power yields that are obtainable from an ordinary motor-vehicle engine, unaltered structurally as regards the compression space, may on the average be accepted as:

When working on petrol	100
,, ,, ,, town gas of 450 B.Th.U. (gross) per c.ft.	91
,, ,, ,, suction producer gas (partly hydrogenated with water gas) of 210 B.Th.U. (gross) per c.ft.	87
,, ,, ,, suction producer gas of 140 B.Th.U. (gross) per c.ft.	82

14.—Portable suction-gas producers are available of types adapted for the propulsion of commercial goods-carrying vehicles. Such plants, after the necessary attention at lighting-up, can be made to function automatically. Their fuel cost, with coke at 45s. per ton or anthracite at 55s. per ton, is equivalent to petrol at 5·4d. per gallon; 1 cwt. of coke or anthracite will on the average do the same work on the road as 5·6 gallons of petrol; and the weight of generator and accessories for a 30-B.H.P. engine is about 220 lbs.

15.—The risk of escape of unburnt carbon monoxide gas from a suction-gas plant in a motor vehicle is not such as to call for the exercise of special precautions, except while the vehicle is at rest overnight within an enclosed structure with the fire still burning in the producer.

16.—The water-feed to a portable suction-gas producer can be so adjusted as to increase the calorific value of the issuing gases by as much as 50 p.ct. on a consumption of water falling as low as 25 p.ct. by weight of the simultaneous consumption of anthracite or coke.

17.—Importance has, heretofore, been attached by motor-vehicle users to the relative calorific values of combustible gases, instead of to those of mixtures of such gases with the requisite volumes of air, in forecasting the respective power yield on their internal combustion.

18.—Suction gas, employed alone or partly hydrogenated with water gas, should in the near future prove a suitable alternative fuel for use in internal combustion engines primarily designed to run on alcohol.

19.—Physical difficulties of storage and conveyance, in conjunction with allied considerations of cost, render the use of liquified hydrogen, methane, carbon monoxide, or ethylene—which gases are, or may shortly become, available for liquification on the large scale—commercially impracticable for traction work.

20.—There is an increase of weight when an absorbent material is introduced, compared with that when cylinders containing only gas under compression are used, for any given volume of free gas, and no saving in the total cubic space occupied.

21.—The necessary extra provision to utilize systems for enriching gas in any vehicle does not yield commensurate advantage, with possible, but as yet unproved, reservations in favour of the use of acetylene or naphthalene.

Recommendations.

22.—The national importance of ordinary town gas as a home-produced and distributed fuel for power and traction purposes should now be brought within the official cognizance of all departments of Government, both central and local.

23.—There should be all possible departmental and local-authority encouragement and provision for the extension of gas-power and gas-traction facilities.

24.—No restrictions or regulations other than those that may be necessary to ensure compliance with the terms of our report should be placed upon the drawing of gas for traction purposes through suitable meters at consumers' premises or private filling-stations, subject to the sufficiency of local supplies of gas.

25.—Rotary meters should be tested with a "flying" start, and their use approved if they are accurate within 2½ p.ct. (*plus* or *minus*) while capable of passing gas.

26.—Sections 12 and 13 of the Sales of Gas Act, 1859, should be so amended as to give certain new powers to the Board of Trade with reference to gas-meters.

27.—No regulations that are not equally applicable to petrol-driven vehicles should, as regards access to public wharves and warehouses, or the estates and premises of dock and harbour authorities, be applied to gas-propelled vehicles which are equipped to run on compressed gas.

28.—The circulation of motor traffic by means of power derived from self-contained, portable, suction-gas plants should be approved by the Fire Offices Committee.

29.—The use of semi-rigid containers made of an inner bag of rubber and an outer casing of woven steel-wire with end-plates of solid metal, if constructed and tested to our specification, should be permitted for working pressures up to 45 atmospheres.

30.—Any cylinder or cylinders to contain gas under compression should, when fitted in a vehicle for traction work, be disposed within, and be totally enclosed by, the bodywork or other substantial material of the vehicle structure.

31.—Any cylinder or cylinders fitted in any vehicle to contain gas under compression for traction work should by preference be re-charged while in position in the vehicle.

32.—No individual, firm, company, or other undertaker should be allowed to compress gas for traction purposes, or to supply or charge cylinders for such purposes, except after notification to, and registration by, the Ministry of Ways and Communications.

33.—The use of cylinders of carbon or certain alloy steels, made to comply with the specification which forms an appendix, should be permitted in traction work for internal pressures up to 2250 lbs. on the square inch; and our specification should now in respect of such purposes replace that of the Home Office Committee of 1895.

34.—The safety-valve on the charging side of any compressor, on its use for the delivery of gas to cylinders for traction purposes, should be set for not more than 5 p.ct. excess of the actual working pressure approved for the particular service, and under no circumstances for a pressure higher than seven-tenths of the test pressure marked on the cylinder.

35.—There should be provision at any compressing installation to ensure that air is not drawn into the compressor with the gas; and other precautionary measures should be based upon the model set of regulations given in an appendix.

36.—Piping, joints, reducing-valves, gauges, and other control fittings and accessory parts should comply with the general recommendations in our report; but we consider it unnecessary to lay down hard-and-fast rules on points of detail other than a standard connection, which should be cut to ⅝-in. British standard pipe thread.

37.—A vehicle deriving its power from a portable, self-contained, suction-gas producer should not be housed under living-rooms in human occupation, or while the fire is alight be stored overnight in the same building or enclosed structure as a petrol-driven vehicle.

TAR DISTILLATION BY GAS UNDERTAKINGS.

Burnley's Profitable Results.

In his Presidential Address to the Manchester District Institution of Gas Engineers, in March last year, Mr. J. P. Leather pointed out that information obtained by the Institution indicated that the best financial results are obtained for tar by gas undertakings which distil their own product. In the autumn of 1916 there was erected at Burnley a continuous distillation plant (Hird's patent), with which they obtain four liquid products—crude naphtha, light oil, creosote, and anthracene oil—in addition to pitch and creosote salts (crude naphthalene). The cost of the plant was paid out of revenue; and it was expected that it would be entirely recouped in two years. Mr. Leather added in his address that the sale of pitch had been a difficulty; but that nevertheless, after deducting all expenses, and allowing for interest and depreciation, there was secured 80 p.ct. more than the best offer received from tar distillers immediately before deciding to erect the plant.

When noticing [*ante*, p. 94] Mr. Leather's report on the past year's operations of the Burnley Corporation Gas-Works, it was stated that the figures relating to tar distillation showed a balance of 52s. 1d. per ton on the 2711 tons of tar produced during the year. A reduction should, however, be made for the quantity of gas used in distillation, valued at £1468. The net receipts for tar were therefore £5756, or equal to 41s. 6d. per ton of tar.

The following figures indicate just how this result was arrived at: The quantity of tar produced during the year was 2711 tons; but the quantity distilled was 3180 tons.

Crude tar sold			£32 9 7
Tar products sold—			
Prepared tar, 4040 gallons	£42 1 8		
Pitch, 2051 tons	2,684 4 3		
Anthracene grease, 4 cwt.	0 16 0		
Creosote salts, 21 tons 6 cwt. 2 qrs.	85 6 0		
Creosote, 159,183 gallons	2,830 18 0		
Light oil, 103,370 gallons	3,060 4 0		
Crude naphtha, 8800 gallons	377 6 9		
		9,080 16 8	
Add stock at March 31, 1919—			
Crude tar, 520 tons at 40s.		1,060 0 0	
Pitch, 286 tons at 30s. 6d.	£436 3 0		
Creosote salts, 5 tons at £4	20 0 0		
Anthracene slurry, 2120 gallons at 4d.	35 6 8		
Creosote, 19,283 gallons at 4½d.	341 9 5		
Light oil, 9259 gallons at 7d.	270 1 1		
Crude naphtha, 2040 gallons at 8½d.	72 5 0		
Prepared tar, 400 gallons at 3½d.	5 16 8		
		1,181 1 10	
		£11,354 8 1	
Deduct stock April 1, 1918—			
Crude tar, 1015 tons at 32s.	£1,624 0 0		
Pitch, 490 tons at 19s.	465 10 0		
Creosote salts, 7½ cwt. at 4s.	1 10 0		
Creosote, 12,648 gallons at 4d.	210 16 0		
Light oil, 13,005 gallons at 7½d.	406 8 2		
Crude naphtha, 1576 gallons at 8½d.	55 16 4		
	£2,764 0 6		
Cost of distillation	1,365 3 10		
		4,129 4 4	
Balance		£7,225 3 9	

WELSBACH LIGHT COMPANY, LTD.

A Strong Financial Position.

The Eighth Annual General Meeting of the Company—presided over by Mr. J. R. YATES (the Chairman)—was held last Wednesday, at Winchester House, Old Broad Street, E.C.

The SECRETATY (Mr. E. J. Butcher) read the notice convening the meeting, and the certificate of the Auditors; and the Directors' report [*ante*, p. 246] and the statement of accounts were taken as read.

The CHAIRMAN, in moving the adoption of the report and accounts, said they were meeting that day under happier external circumstances than those of the last five years. In their own business they were able to report a net profit of £57,000, on a capital of £175,000—a result which, with the one exception of last year, was the best in the history of the Company, and this in face of rising costs with the dislocation and unsettlement caused by the transition from war conditions to peace. Their Company, like so many other commercial concerns, were dependent before the war for raw materials upon enemy sources of supply; and the securing of other supplies, and maintaining, if possible, a steady flow of raw materials, had necessitated their taking the risk of heavy advance contracts. This risk, he had reminded them a year ago, they had had to face; but it involved wider purchases, greater outlay, and the necessity of multiplying their sources of supply where possible to do so—no one then having any idea when the war would end. Though they succeeded in obtaining the essential raw materials for their industry as a result of this policy, they felt during the past year the full effect of the increased costs of these commodities. In the year 1917-18 they had the advantage of converting into the finished article stocks of half-finished goods and raw materials which had been bought before the various heavy rises had occurred. In the past year they had not this benefit, but had had to rely upon stocks purchased at prices far exceeding those of prior years. Among the materials which were largely increased in price were thorium nitrate, ramie yarn, boxes, spirit, ether, and other commodities. In addition, increased wages were responsible for a further advance in the cost of production over 1917-18. Moreover, the sudden advent of the armistice, with the cessation of submarine warfare, caused some material stock values to drop, thus adversely affecting the accounts. In stating this, it must not be overlooked that the policy of securing and carrying large stocks enabled them in the preceding year to establish a record in the history of the Company, and throughout the war to obtain very successful results. Following the armistice came the general feeling of unrest and rising cost of production which had been so marked a feature throughout the industrial world. The result was an increase in the cost of producing the mantle, which it had not been possible, nor would it have been politic, to pass wholly on to the customer.

THE GROWTH IN PROFIT.

Turning to the profit and loss account, the profit on trading was £55,718. Combined with the B. Cars, Ltd., profit, there was the aggregate of £73,474, compared with similar aggregates in preceding years of :—

1918	£146,300
1917	55,100
1916	41,100
1915	27,200
1914	17,000
1913	5,700
1912 a trading loss of	4,300

On taking the average of the four war years (including last year's large figure), there would be found this year a substantial advance on the average of these profits; and taking the whole of the seven years from 1912 to 1918 inclusive, there was a still larger advance on the average. Similar striking results were found if they took the Welsbach particular profits separately. It must be remembered that up to three years ago the Company had never paid a dividend; and that the sum total of all the dividends paid prior to this date was 17¼ p.ct. From the year 1912, the factory output of mantles had gradually risen to the extent of 100 p.ct. and last year it was larger than in any previous year. With reference to B. Cars, Ltd., it might not be inopportune to remark that on an investment standing in their balance-sheet at £31,500, they had in six years received £78,000 in dividends. Transfer fees were £202, as against £100; and interest £6077, as against £4487. On the debtor side they had repairs and depreciation of property, plant, and furniture, £9567, against £8006, and a loss on realization of investments, £128, as against a writing off last year of £2377. The audit and accountancy fees were £460, as against £367; and the law and incidental charges £546, against £910. Income-tax was considerably up, £4330, as against £3600, arising from the ascending scale in the profits on the three years' computation—a result which might be expected to tell against the Company in the years immediately following the recent large figures. Hence the proposal to make a reserve against income-tax out of the available profits. The Directors' fees drawn were £2000, as against £1150, in accordance with the re-arrangement made at the extraordinary general meeting last year. Trustees' fees were the same. The interest on the debenture stock was down, owing to redemptions; while the balance of net profits, subject to excess profits duty, was £57,130. On the assets side of the balance-sheet no change had occurred in goodwill, patents, patent rights, trade marks, &c., which stood at the very low figure, having regard to the Company's position, of £7304; nor was there any change in the next three items, which were trade investments—namely, the shares in B. Cars, Ltd., in New Sunlight, and in Clay Ring. He had already referred to B. Cars, Ltd. New Sunlight was a branch of their business wherein the Board considered it advantageous to retain the organization of a separate private Company. The Clay Ring Company, as the shareholders had previously been informed, was a Company for the manufacture of mantle rings—a manufacture essential to their own business, and formerly controlled by the enemy. In this private Company the Welsbach Company and four other firms had each one-fifth interest; and their Managing Director was Chairman. As an auxiliary trade investment the Board regarded it as of considerable value. Leaseholds—that was the factory at Wandsworth, because other leaseholds stood in the books at *nil*—were, owing to slight additions, fractionally higher than the figure in last year's balance-sheet. During the course of the current year some additions to their factory would have to be made—in fact, they were long overdue. For some time past the manufacture there had been carried on under conditions which could not be regarded as at all satisfactory. More elbow-room was required. But unfortunately the war prevented them from doing some time ago what had become an absolute necessity; and, needless to say, the cost would considerably exceed the former standard of building prices, and so on. Plant, machinery, tools, &c., were down to the figure of £5642, as against £13,434. This diminution was to a large extent accounted for by the closing-down and disposal of the munitions department, which was established for the purpose of helping the Government, and became a controlled establishment. For their efforts and efficiency, the Company received the thanks of the Ministry of Munitions. Freehold property was up about £450; the increase being due to certain necessary alterations. Last year 4 p.ct. was written-off for depreciation—a course which, under present altered values of property, it was unnecessary to repeat. In the large and generally up-to-date freehold block of buildings in Gray's Inn Road and Wicklow Street, the shareholders had an extremely valuable asset, which could not now be obtained at anything like the figure at which it stood in the balance-sheet. The item of sundry debtors, like sundry creditors, was down—namely, £60,633, as against £80,092. Stock in trade (which a year ago was £103,599) stood on March 31 last at £121,507, which reflected the increased costs previously mentioned. Cash at the bank and in hand at the end of March amounted to £102,267. On the other side of the balance-sheet, the issued shares remained as before at £175,000. There were 90,000 shares unissued, which could only be dealt with under the authority of an extraordinary resolution of the Company. The debenture stock had been reduced by redemptions and cancellations during the year to the extent of £4800—bringing down the amount outstanding to £118,185. Sundry creditors and credit balances stood at £16,493, against £29,793 in the last account. With regard to excess profits duty, which had proved a very difficult subject, the operation of the Act as originally claimed to be interpreted tended to place great hardship on the Company, in view (among other reasons) of the comparatively small capital since the drastic writings-down which had occurred in past years, and also in view of their pre-war losses. Lengthy negotiations took place with the Inland Revenue authorities in reference to the Company's liability; and a basis of

settlement was reached which took account of the factors to which he had referred, and resulted in the duty for the year ended March 31 last being computed at the figure appearing in the balance-sheet (£78,276). Though they had had differences of view with the Inland Revenue, they must recognize that the authorities went into this difficult and complex subject, and vast masses of records and figures, with the utmost thoroughness, and certainly with the desire to find a reasonable and fair solution of the problems under discussion. Subsequently to the settlement of their standard, a general application for an increase in the statutory percentage on behalf of the incandescent mantle trade came before the Board of Referees, with the result that an award was made of an additional 3 p.ct., with retrospective effect. The figures, after taking into account *per contra* additional income-tax payable by them on the excess profits duty to be written-back or refunded, would leave a substantial amount to the Company's credit, which would come into next year's accounts.

ARE BRITISH MANUFACTURERS TO HAVE A FAIR OPPORTUNITY?

He had on previous occasions referred to the vast system of dumping practised by the Germans before the war, under which this country was swamped with quantities of goods delivered here at prices far under cost. Mantles were supplied here by the principal German factories at approximately one-half the price charged to customers in Germany, and below English factory costs, without adding to the cost anything for overhead charges. The question therefore arose, now that they and other manufacturers had, after almost insuperable difficulties, succeeded in establishing the British incandescent mantle trade on a basis independent of enemy supplies of raw materials, and had kept the home market going throughout the war, whether under these circumstances British manufacturers were to have a fair opportunity of supplying British requirements, or whether they were to be crushed by under-cost-price foreign goods. The proprietors would no doubt have noticed the introduction of a Bill into Parliament dealing with the supply of electricity on a large scale—a Bill involving vast powers under centralized control backed by the State. The gas industry and its allied trades were watching; and the Directors asked the shareholders, and through them their several Members of Parliament, to watch carefully the progress of this measure. Given a fair field, there was no cause for alarm at the competition of electricity. To this sense of their strength nothing had contributed more than the original invention of the Welsbach mantle—a world-wide benefaction which, as that most eminent scientist Lord Moulton told them last year, had not been sufficiently recognized, and the importance of which, indeed, increased rather than diminished. Never was there a greater need for the conservation of coal supplies; and as stated in the report of Lord Balfour of Burleigh's Committee on Essential Industries, the gas mantle was one of the greatest factors in the economical use of coal. As to the appropriation of the profits, the Board, after due consideration of all the factors to which he had referred, had decided to recommend the payment of a dividend of 10 p.ct., and a bonus of 5 p.ct., less tax, which followed upon previous distributions of 2½ p.ct., 5 p.ct., and 10 p.ct. It was proposed to carry £25,000 to reserve against income-tax and excess profits duty, and £35,000 to general reserve—leaving £17,764 to be carried forward. They were thus making a substantial and an increased distribution among the shareholders, and maintaining the strong cash position of the business, to which the Board attached so much importance. As he had emphasized on previous occasions, the proprietors possessed the leading concern in the incandescent mantle industry; and the Board believed that the balance-sheet they presented that day was on as sound and solid a basis as at any time in the history of the undertaking.

The Vice-Chairman (Mr. Charles Lock), in seconding the resolution, said the amounts set aside to reserve would place the Company financially in a very strong position.

Considerable discussion followed, and various questions were asked; several shareholders expressing the opinion that in the matter of dividend the Board had not been very generous, and that a larger distribution might well have been made. Mr. J. M'Laren, who said he represented a considerable shareholding in the Company, offered some criticisms, which he concluded by moving an amendment to the effect that the report and accounts be accepted, but not approved, and that a Committee of Inquiry be appointed. The amendment was duly seconded; but on the Chairman pointing out that the sense of the meeting appeared to be against it, Mr. M'Laren withdrew it.

The motion for the adoption of the report and the declaration of the dividend and bonus was then adopted, with a dozen dissentients.

Mr. Yates was re-elected a Director, on the proposition of Mr. Lock, seconded by Lord Weardale—both remarking that in the Chairman the Company have an excellent man of business, who is conducting the affairs of the Company with prudence and with increasing success.

Some Gas Price Increases.—In view of the increased price of coal, the West Bromwich Gas Committee, among others, have had under consideration the question of the price of gas. The increase of 6s. per ton in the price of coal is in excess of the amount allowed for to the extent of 1s. 6d. per ton, which is practically equivalent to a further 1½d. per 1000 c.ft. in the cost of the manufacture of gas. In the circumstances, the Committee recommend the Council to apply to the Board of Trade for an Order increasing the present maximum price of 4s. per 1000 c.ft. to 5s. The Sheffield Gas Company have decided to advance the price of gas 9d. per 1000 c.ft., this making the fifth increase since the outbreak of the war. The Coventry City Council have decided to increase the price of gas 6d. per 1000 c.ft. The Directors of the Radcliffe and Pilkington Gas Company, whose area covers Radcliffe, Prestwich, and Whitefield, are immediately increasing the price of gas to 4s. 7d. per 1000 c.ft. net. The Todmorden Corporation have increased the price of gas for lighting from 4s. to 4s. 6d. per 1000 c.ft., and for power from 3s. 4d. to 3s. 10d. In the Brighouse Town Council, a resolution to defer a proposed increase of 3d. per 1000 c.ft., on the ground that there was a surplus of 2d. reported last year, was defeated. It was explained that the 2d. had already been absorbed by rises in wages.

WOODALL-DUCKHAM VERTICALS FOR GLASGOW.

At a Meeting of a Special Sub-Committee of the Gas Committee of the Glasgow Corporation additional information was submitted as to the different types of vertical retorts in operation in various gas-works in England and Scotland; and members were appointed to visit certain gas-works in the Midlands, and, if necessary, to arrange for tests being made with coals of the quality at present being used by the Glasgow Gas Department.

Subsequently the members reported, and the Sub-Committee decided in favour of the substitution of vertical retorts for the present horizontals.

It was reported that patentees and makers of vertical retorts had been asked (for the information of the Sub-Committee) to submit offers for the erection of a vertical retort plant to carbonize 650 tons of coal per day, and, alternatively, for a plant of double this capacity, at the Provan Gas-Works; and that certain makers had intimated their inability to comply with the request, on account of having booked sufficient orders for immediate and future execution.

The Town Clerk submitted the two offers received, and, after hearing the views of the General Manager, and after full consideration, it was agreed to recommend the Sub-Committee on Contracts to accept (subject to certain adjustments) the offer of the Woodall-Duckham Company, Ltd., to erect a section of vertical retorts at Provan.

At a meeting of the Sub-Committee on Contracts, the Town Clerk reported that, at a meeting of the Special Sub-Committee on Vertical Retorts, it had been agreed to recommend: (1) That a system of vertical retorts be erected at the Dawsholm, Provan, and Tradeston Gas-Works, in lieu of the present system of horizontal retorts; (2) that a commencement be made by erecting a section at the Provan Gas-Works of the "Woodall-Duckham" type; and (3) that, subject to adjustment, the portion of the offer now submitted by the Woodall-Duckham Company, Ltd., for the coal-handling and carbonizing plant and the waste-heat boilers, amounting to £266,852, to execute this work be accepted, and that the purchase of the coke-handling plant be continued for further consideration.

The report was approved.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

London, *Aug.* 2.

Pitch continues to attract many inquiries from the Continent for shipment next season, and the f.o.b. price remains strong. Belgium is still taking considerable quantities, notwithstanding it being summer time. There is more home demand for creosote, no doubt in consequence of the increased cost of coal. The value is about 5¾d. net per gallon in bulk at makers' works for large supplies; smaller lots being about 6d. per gallon. Other tar products are unchanged.

Sulphate of ammonia is without any new feature.

Tar Products in the Provinces.

Aug. 1.

The average values for gas-works products during the week were: Gas-works coal tar, 36s. 3d. to 41s. 3d. Pitch, East Coast, 62s. 6d. to 65s. per ton f.a.s.; West Coast—Manchester, 53s. 6d. to 56s.; Liverpool, 53s. 6d. to 56s., Clyde, 62s. 6d. to 65s. nominal. Benzol 90 p.ct., North, 1s. 8d. to 1s. 10d.; crude 65 p.c., at 120° C. 11d. to 1s. naked at makers' works; 50-90 p.ct. naked, North, 1s. 8d. to 1s. 10d. Toluol, naked, North, 2s. to 2s. 1d. nominal. Coal tar crude naphtha in bulk, North, 7¾d. to 8¼d. Solvent naphtha, naked, North, 1s. 9d. to 1s. 11d. Heavy naphtha, North, 2s. 3d. to 2s. 5d. Creosote, in bulk, North, liquid, 5d. to 5¼d.; salty, 4¾d. to 4¾d. Heavy oils, in bulk, North, 6d. to 6¼d. Carbolic acid, 60 p.ct. 1s. 5d. to 1s. 6d. Naphthalene, £16 to £18; salts, £5 to £6, bags included. Anthracene, "A" quality, 7½d. to 7¾d. per minimum 40 p.ct.

FROM A MARKET CORRESPONDENT.

Tar Products.

Conditions have not changed since my last report, and there is little fresh news regarding tar products. The whole situation turns on the attitude of labour and the advance in raw material quotations. Fears are expressed that the outcome of present difficulties will be the shutting-down for a considerable period of many blast-furnaces. This would at once affect the coke-oven production of bye-products. The gas producers, also, are seriously hit; and the outlook does not at the moment seem particularly bright. It would appear that any advance in bye-product prices would be more than swallowed up in outgoings. Pitch keeps strong, particularly in the North; and although little new business is being executed, good inquiries are to hand for the shipping season soon to begin. The export prospect, in fact, is the brightest spot in the situation. Crude tar remains firm, and creosote continues in demand, with well-informed centres anticipating higher quotations in the early future. Cresylic acid is steady, and a continued improvement is to be noted in carbolic acid. Beyond the fact that makers of crystals seem to have disposed of old stocks and are now buying sparingly of crudes, no particular reason can be assigned. Naphthalenes are rather better in tone, although not much impression is to be noted on quotations. Naphthas (solvent especially) are wanted in moderate quantities. Benzol is rather a difficult subject at the moment; the position being complicated by early increased importations of petrol from the States. The specification has been slightly improved, however, by a reduction in the sulphur content; and bearing in mind that a gallon of benzol will do at least 15 p.ct. more work than the same amount of petrol, the situation is not yet lost. There is clearly time to save it permanently by means of suitable propaganda. It seems strange that some of the most progressive business houses almost refuse

to adopt the obvious solution. Toluol is without change. Other products exhibit no particular feature.

The range of quotations is as follows:

Benzol: 90% London 2s. to 2s. 2d., North, 1s. 11d. to 2s.; 50-90% 1s. 9d. to 2s. London, 1s. 9½d. North; crude 60-65% 1s. 3½d. to 1s. 5½d.; pure, 3s. per gallon naked.

Carbolic acid: Crude 60's 1s. 6d. per gallon nominal; crystals, 40%, 6d. per lb. asked.

Crude Tar: London, 45s. to 50s.; Midlands, 44s. to 46s.; North, 44s. 6d. per ton *ex* works.

Pitch: London, 67s. 6d. to 70s. per ton; East Coast, 55s. to 60s. per ton; West Coast, 54s. to 58s., with Manchester 57s. per ton and Glasgow 58s. per ton; South Wales, 64s. to 68s. per ton.

Solvent Naphtha: London, 2s. Provinces average 1s. 10d. per gallon.

Crude Naphtha: Naked, 10d. per gallon.

Heavy Naphtha: 2s. 3d. per gallon.

Naphthalene: Refined, £15 to £17 per ton nominal; crude, £4 to £8, according to quality.

Toluol: Naked, 2s. 9d. per gallon nominal. North, 2s. 7d.

Creosote: London, 7¼d.; North, 5¾d. to 6¼d.; heavy oil, 6d. per gallon in bulk.

Anthracene: 40-45%, 6d. to 8d. per unit per cwt.

Grease Oils: 18° Tw. (naked), £6 10s. per ton f.o.r. makers' works.

Aniline Oil: 1s. 2d. per lb.

Cresylic Acid: 95%, 2s. 4d. to 2s. 6d.; 97-99%, 2s. 7d. to 2s. 9d. *ex* works London, f.o.b. other ports.

Sulphate of Ammonia.

Information is meagre, and a canvass of leading firms—London and Provincial—produces no fresh ideas regarding the situation. Although official restrictions are removed, nothing can be done except through the semi-official Association. There is nothing available this side of September, and quotations for after that time are due for fixing during this month (August), after which it may be possible to obtain some fresh points on future trading.

Whitworth Vale Gas Company.—The Directors in their half-yearly report state that there is a profit of £487, which, added to the sum of £667 brought forward, reduced by loan and bank interest, makes a disposable balance of £1095. Dividends of 5 p.ct. per annum on the original shares and on the amount called up on the "B" shares are proposed. Sales of gas during the past six months realized £3487; and the coal purchased cost £2171. The report states that the Directors are noting with grave concern the action of the Government as regards the price of coal, and the statutory limitations in the rate chargeable for gas.

Stourbridge Gas-Works Accounts.

In his fourteenth annual report on the operations of the Borough of Stourbridge Gas Department, Mr. Charles H. Webb, M.Sc. (the Engineer and Manager), says the quantity of gas manufactured during the year ended March 31 was 283,727,000 c.ft., which was an increase of over 10 p.ct. on the previous year. The percentage of gas sold increased from 91·55 to 91·95; while the percentage of unaccounted-for gas dropped from 6·42 to 5·90. On revenue account the income increased by £8662, due to the increased price and sales of gas, and the good prices obtained for residuals; the latter yielding 76·54 p.ct. of the cost of coal and oil. The expenditure on revenue account has again been very heavy, due to the high cost of materials and the very considerable advances made in the rate of wages paid. But notwithstanding this the balance carried to the profit and loss account increased by £465, being £13,957. The price of gas has been increased as little as possible during the year; but certain necessary advances had to be made. After the usual deductions for income-tax, annual instalments, and interest, the surplus is £3455.

Birmingham Gas Charges.—At a meeting of the Birmingham City Council on Tuesday last, the new scale of gas charges (as given in the "JOURNAL" last week, p. 246) was approved. The report of the Gas Committee was presented by Alderman J. H. Lloyd, the Chairman, who urged the necessity for the earlier reading of the meters. The loss in revenue would be most serious if the Committee waited till September. The conditions generally were changing so rapidly that the Committee thought, notwithstanding the extra work involved, it was necessary the advance in the price of gas should take effect at once. The Committee viewed the continued increases in cost with anxiety. The maximum price they were permitted to charge under the present Act was 4s. per 1000 c.ft.; so that the margin now left was extremely small. Apart from this, there had to be borne in mind the very serious effect not only on the private citizen, but on the whole of the manufacturers in the city. As to the coal strike, their deliveries had already suffered to the extent of 16,000 tons since the commencement of the stoppage. The Coal Controller was sending additional supplies from Durham; and while they were glad to have this coal, every ton cost them at least 6s. more than coal from their ordinary collieries, apart altogether from the increased costs of working with coal which was unsuitable for use on the plant installed at the gas-works. The Gas Committee were very anxious in regard to the stock of coal for next winter. If the strike had not occurred, it was hoped they would be in a better position than last autumn. But they had now to take from stock; and it was very problematical whether it would be possible to replace it before the winter demand. They hoped it would not be necessary to reduce the supply of gas; but if this were found advisable, due notice would be given to the public. The increased prices will be charged after a special reading of the meter indexes to be taken forthwith.

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Professor Harcourt and Coke Fires.

In a letter to "The Times," Prof. A. Vernon Harcourt gives a further account of his personal experiences with the use of coke. He says: "Whatever may be the rights of the sudden announcement of a 6s. increase in the price of a ton of coal, *cantabit vacuus*. I have bought no coal for many years, nor need any householder do so who is willing to use a grate of the simplest form burning coke. The fire-bars are straight, ½ in. thick, 2 in. apart, and 5 in. in front of the back of the grate, ten in number one above the other. Their length varies from 8 in. to 20 in. or more, according to the size of the room to be heated. To lay the fire the grate should be filled half-way up with coke, then an iron plate resting on two or three large knobs of coke, then more coke to near the top, then several pieces of loosely crumpled paper, a good supply of wood, and above this 2 in. or 3 in. of coke. To draw the fire up, plates must be provided which may either be hinged at the sides or suspended one from another—that at the top reaching to the highest bar. Once alight, the fire burns gradually downwards, like a candle, lasting twelve hours or more with little attention beyond the withdrawal of the plate which checks the fire and adjustment of those which draw it up. If London householders would adopt such fires as this, how different its atmosphere would be! Now that the war is over we no longer need the protection of low visibility."

Industrial Councils and the Gas Industry.—The July "Bulletin" on the work of the Joint Standing Industrial Councils (issued by the Ministry of Labour) gives the estimated numbers of workpeople represented in such Councils in each industry. For gas undertakings, the figure is 94,000; and for electricity supply, 29,000.

Brave Gas-Workers Honoured.—At a meeting of the Birmingham Gas Committee (presided over by Alderman Lloyd) on Monday of last week, the Mayor (Alderman Sir David Brooks) presented bronze medals and certificates of the Royal Humane Society to Christopher Goss (33), boilersmith, and Tom Mathews (57), fireman—employees of the Gas Department—for conspicuous bravery. They are employed at the Nechells Gas-Works, and on Sept. 10 last year Goss and another boilersmith named Frank Dale were employed in cleaning and overhauling two boilers. While engaged in the flue, caulking a joint in the bottom of one of the boilers, Goss found it necessary to go out into the fresh air. During his absence he noticed that Dale had stopped hammering, and getting no reply to his calls, he re-entered the flue, where he found Dale lying insensible from waste gases. He endeavoured to pull him out. While doing this, Goss was overcome by the fumes and collapsed; but Mathews, who was at work near the spot, promptly entered the flue and succeeded in rescuing both men. The Lord Mayor, in making the presentation, said the conduct of Goss and Mathews was beyond all praise; and he warmly congratulated them. The door of the flue was only 17 in. by 12 in.; and the fact that the men entered and left through it added to their bravery.

Newport (Mon.) Gas Company's Report.—With the transfer of £1500 from the reserve fund account, the Directors of the Newport (Mon.) Gas Company recommend for the half year ended June 30 the payment of a dividend at the rate of 4 p.ct. per annum on the consolidated stock. They record with deep regret the death of Alderman Thomas Canning, who was for over 44 years the Engineer and in addition for the last six years a Director of the Company. As already announced in the "Journal," the post of Engineer has been filled by the appointment of Mr. J. H. Canning, who was for six years Works Manager under his father.

Natural Gas and Oil in Derbyshire.—An interesting experiment, it is reported, is being made at one of the Derbyshire oil wells at Heath. A considerable volume of gas is escaping from the shaft, and an opportunity has been taken to use this for drilling machinery. A boiler has been put down; and it is fired by natural gas. Drilling has been suspended at Hardstoft, pending the installation of a powerful pump to increase the flow, which has slightly increased to 540 gallons per twenty-four hours. This is the only well which is giving a yield—the borings at other places not having produced the anticipated results. It is stated that if oil is not struck soon, there will be no alternative but to abandon these.

Unexampled Difficulties and Satisfactory Results at Maidstone.—The annual meeting of the Maidstone Gas Company will be held on Thursday, when the accounts to June will be submitted by the Board. The report states that, despite a slight reduction in freights during the last few months, the cost of coal for the whole year again showed an increase. Since the issue of the last report two further advances in wages have been given, and the working hours of employees have been reduced, in accordance with a recommendation of the Court of Arbitration. Throughout the year the price of gas in Maidstone remained at 4s. 4d. per 1000 c.ft.; but the Directors are now faced with the necessity of applying to the Board of Trade for permission to advance the price by 6d. The accounts show that after providing for all fixed charges—including £2000 depreciation in respect of stoves and fittings, and £1831 to the renewals fund—there remains an available balance of £14,144. Under the Statutory Undertakings (Temporary Increase of Charges) Act, 1918, the Company are making application to the Board of Trade for permission to pay a dividend for the year of 3¾ p.ct.; and, subject to the approval of the Board, the Directors recommend that this dividend (less tax) be paid. An interim dividend at the same rate was paid last March. Owing to the effects of the Household Fuel and Lighting Order in the first half of the financial year, the total sales of gas showed a reduction of 11¼ millions, as compared with the previous year. The shortage of solid fuel, and the scarcity of labour, have resulted in a growing demand for gas-consuming appliances of all kinds, and particularly for the provision of hot water for domestic use. The Directors, therefore, consider it necessary to transfer the sum of £1831 to the renewal fund to meet prospective renewals of plant.

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Gas Prices at Manchester.—The Manchester Corporation Gas Committee have decided to recommend the Finance Committee to increase the price of gas 6d. per 1000 c.ft., to come into force on Sept. 29. The present price in Manchester is 3s. 6d., less 2d. discount.

Carbon Smokeless Fuel, Ltd., has been registered, with a capital of £75,000 in £1 shares, to acquire coal mines, coal, coke, coal gas, and chemical substances for the manufacture of benzol and sulphate of ammonia. The registered office is at No. 5, Albany Court Yard, Piccadilly, W.

Price of Gas at Shipley.—At the last meeting of the Shipley District Council, it was mentioned that before the 6s. advance on coal the Council had had to increase the price of gas, as from July 1, to the statutory maximum of 5s. 5d. per 1000 c.ft., less 2d. discount; but the Chairman of the Gas Committee (Mr. T. Hill) said the new coal bill would mean either a still further increase—probably 4d. per 1000 c.ft.—or else higher rates.

New Use for an Old Holder.—The following is taken from the "American Gas Engineering Journal:" The demand of the residents of the south end of Holyoke (Mass.) for a new bathhouse, has been heard; and in compliance with the request of the Board of Public Works and the Chairman of the Playground Commission, City Engineer T. J. McCarthy made an inspection of the big gasholder in South Bridge Street, to determine the cost of converting it into a public bathhouse. The building was found to be sufficiently large; but there are so many other things to consider that Engineer MacCarthy must be given some time to estimate the probable cost of the change.

Gas Price and Dividends at Preston.—The Preston Gas Company have notified the Corporation that the price of gas is 11d. per 1000 c.ft., less the usual discounts, making the gross price 4s. 9d. per 1000 c.ft. With this advance, the price of gas is 50 p.ct. above the pre-war price, though the Company are paying 125 p.ct. more for coal and 130 p.ct. more for labour than before the war. The standard dividend on the "A" stock will be reduced from 10 to 5¾ p.ct., and on the "B" stock from 7 to 4 p.ct. The Directors have, therefore, decided to make application to the Board of Trade under the Statutory Undertakings (Temporary Increase of Charges) Act for an Order to enable them to pay a dividend on the ordinary stock at three-quarters the standard rates. In view of the recommendations of the Fuel Research Board to the Board of Trade respecting calorific power, the Directors have decided to make application under the Gas (Standard of Calorific Power) Act for a calorific standard to be substituted for the illuminating power standard that was prescribed in the Preston Gas Order, 1911.

Imports and Import Restrictions.—The "Board of Trade Journal" publishes as a supplement a consolidated list of import restrictions, revised to date. Part I. is a list of articles which may be imported without licence from the Department of Import Restrictions. Among them are gas-burners, coal, coke, gas-irons, and tar. Part II. is a list of articles which may not be imported without licence from places outside the British Empire; and licences are not available for goods of German or German-Austrian origin, unless the contrary is expressly stated therein. Included in this list are gas-cocks, gas-mantles, rings, and supports (earthenware), for which licences will be issued for the amount of 1916 imports, in quarterly amounts, lead wool, gas oil, fuel oil and distillates, cast-iron pipes and fittings, gas-stoves, brass and brass-coated tubes, copper tubes, welded iron and steel tubes up to 2 in. diameter, solid-drawn weldless tubing, gun-metal, brass, and bronze valves for gas and water, the same as 1916 imports, and iron and steel valves. Where no ration is stated, the goods will be licensed only exceptionally, as and when required.

Metropolitan of Melbourne Gas Company.—Messrs. John Terry & Co., the London agents of the Melbourne Gas Company, report the receipt of a cable from Australia informing them that the Company's profits for the six months to June 30 were £88,658. A dividend of 6s. 6d. per share has been declared for the half year; and a sum of £23,500 has been transferred to the reserve fund, with a balance carried forward of £77,735. The dividends would be payable in Melbourne (probably) on the 1st inst., and drafts to absentee shareholders would be posted by the first mail thereafter.

Bahia Blanca Gas Company.—An extraordinary general meeting of the Company will be held on Thursday for the purpose of considering a resolution providing for the alteration of the Articles to the effect that one ordinary "A" share (numbered 30,001) shall be allotted and issued to the trustees of the deed intended to be executed for constituting and securing a proposed issue of £100,000 of 6 p.ct. participating debenture stock of the Company, or such other issue of debenture stock, or other securities as may be decidedupon; and the registered holder for the time being of the said share shall, while any moneys are owing on the security of such debenture stock, or of any trust deed securing the same, be entitled to exercise on a poll at any meeting of the Company a number of votes exceeding by one the number of votes for the time being exercisable in respect of all the other shares of the Company.

The price of gas at Helensburgh is increased 6d.—making the rates now 3s. 7½d. per 1000 c.ft. to ordinary consumers, and 4s. 0½d. to slot-meter users. At Kirkcaldy, the price is increased from 5s. 9d. to 6s. 7d. per 1000 c.ft.

A "Caledon" motor-wagon, with hydraulic operated tipping gear, has been acquired by the Middleton Corporation Gas Department. It tips heavy loads with ease, and has a strongly built motor for good speed supplied by the Glasgow Motor Engineering Works.

The "Fletcher" gas-heated domestic labour-saving appliances are the subject of a new booklet prepared by Messrs. Fletcher, Russell, & Co., Ltd., of Warrington, wherein are described the firm's patent indestructible gas cooking-ranges. There are a number of different series of cookers illustrated, with hot-plates, grillers, water-heaters, fires, and radiators to suit all circumstances. The booklet has been issued betimes, in view of the anticipated activity in the building trade. A separate attractive little folder depicts Messrs. Fletcher, Russell, & Co.'s specialities for housing schemes.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official List" for July 30.]

Nos. 18,055—18,616.

AKT.-GES. BROWN, BOVERI, ET CIE.—"Compressing charge in gas-turbines." No. 18,239.
BRADLEY, B.—"Concrete pipes." No. 18,433.
FITZPATRICK, Sir P.—See Bradley. No. 18,433.
HOBSON, W.—"Manufacture of gaseous fuels." No. 18,286.
LEA, D. H.—"Atmospheric gas-burners." No. 18,236.
LESSING, R.—"Manufacture of sulphate of ammonia." No. 18,058.
MARLOW, J. H.—"Gas-fired oven or kiln for manufacture of tiles, pottery, &c." No. 18,283.
SCHROEDER, F. W.—"Gas-burners." No. 18,426.
TREE, M. J.—"Gas-ovens." No. 18,569.
WOLLASTON, T. R.—"Continuous analysis of gases." No. 18,280.

NOTICES TO CORRESPONDENTS, ADVERTISERS, AND SUBSCRIBERS.

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Gas Offices, Warrington, Aug. 1, 1919.

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Municipal Offices, Wigan, Aug. 2, 1919.

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THE Proprietors of British Patents Nos 25,516 of 1906, 25,588 of 1906, 11,152 of 1908, 28,943 of 1910, 4763 of 1912, 4772 of 1912, 8429 of 1912, 20,291 of 1912, 11,591 of 1914, 102,240 of 1916, 105,492 of 1916, and 106,899 of 1916, relating to the "MANUFACTURE OF INCANDESCENT GAS-MANTLES," desire to enter into Negotiations, with One or more Firms in Great Britain, for the SALE OF THE PATENT RIGHTS or for the GRANT OF LICENCES to Manufacture under Royalty.

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